THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[REGISTERED AS A NEWSPAPER.]

VOL. XXXIV. No. 849.] LONDON, AUGUST 19, 1879. [31ST YEAR.] Price 6d.

GAS PURIFICATION
BY
OXIDE OF IRON.

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CO. DONEGAL, IRELAND;
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OFFICES:
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GENUINE TORBAY PAINT
And SPECIAL GASOMETER PAINT.
SEVERAL PRIZE MEDALS. ESTABLISHED OVER 20 YEARS.
These Paints are now used in over 200 Country Gas-Works, and by all the London Gas Companies, on Gas-holders, Scrubbers, Purifiers, &c. Also used by the Admiralty, War Office, Railway Companies, Founders, &c. They prevent and arrest rust, and protect iron from the action of water, sulphurous and gaseous exhalations; do not crack, blister, or flake off; will cover tar effectually.
The covering powers are considerably greater than those of any other Paint.—*See "Engineer," Nov.* 2, 1866.
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CONTRACTOR FOR
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J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts and Fire-Bricks in the Kingdom. Orders for Fire-Clay Retorts of all shapes and dimensions, and to fit any shaped Mouthpiece, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.
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Established at the commencement of Gas Lighting,
MANUFACTURERS OF
TUBES AND FITTINGS.
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MANUFACTURERS OF
WET AND DRY GAS-METERS,
LICENSEES AND MANUFACTURERS OF
HUNT'S
PATENT COMPENSATING METERS,
STREET-LAMPS, &c., &c.
ESTABLISHED 1830.

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SPRING HILL, BIRMINGHAM,
MANUFACTURERS OF
TELESCOPIC & SINGLE GASHOLDERS,
CAST & WROUGHT IRON TANKS FOR DITTO,
And Gas Apparatus of every Description.
Marine, Tubular, Cornish, Main, Furnace, Saddle, and Range Boilers.
SUGAR, SALTPETRE, AND ALL KINDS OF PANS.
Roofs, Girders, and Bridges, and General Smith's Work.
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JAMES E. & SAMUEL SPENCER, Agents.

THE
"OTTO" GAS-ENGINE.
See Page 278.

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DUKE OF HAMILTON'S
LESMAHAGOW
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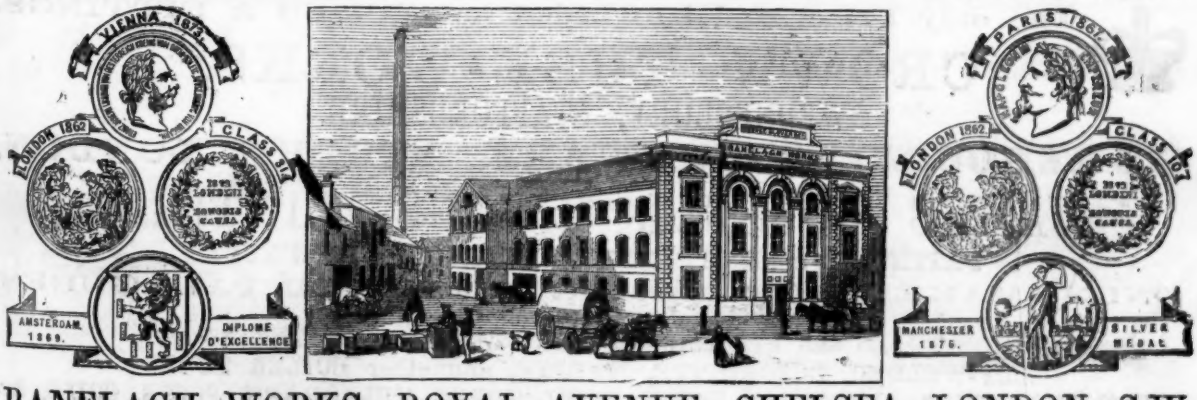
CHANGE OF ADDRESS.
GEORGE GLOVER AND CO.,
DRY GAS-METER MANUFACTURERS,
HAVE REMOVED TO MORE EXTENSIVE PREMISES:



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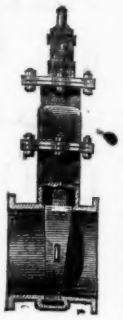
JOSEPH AIRD,

GAS, STEAM, AND HYDRAULIC TUBES AND FITTINGS.

C. & W. WALKERS' DOUBLE-FACED GAS-VALVES.



These solidly constructed double-faced Gas-Valves have taken the place of the old system of the light, single-faced disc, which is too uncertain and unreliable in large bores.

They are guaranteed absolutely gas-tight. They are very massive and rigid, and by improved modes of manufacture they are produced at very little excess in cost over the old light, weak system, which is liable to spring and bend, and become leaky.

The Valve is a rigid wedge of solid cast iron, having two perfectly scraped surfaced facings fitting between the two on the body, which are also surfaced.

A spring in two short halves, and, therefore, not liable to break, is used only for scraping the front facing clean.

The front facing is vertical; the back facing forms the wedge.

At a slight additional expense both flanges are faced to bolt to main-pipes.

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EDWARD E. CROMBIE & CO.,

INVENTORS AND PATENTEES

OF THE

FRICTIONLESS DRY GAS-METERS,

Beg to intimate to Gas Companies and others that they are now prepared to supply these very superior Meters at the same prices as for the ordinary Gas-Meters.

In the construction of this Meter, for which the best tin plates only are used, every mechanical contrivance has been taken advantage of successfully to reduce the friction to a minimum, which is amply proved by the fact that they are made to work upon only one-fortieth of an inch pressure. By an improvement also in their construction, a steadier light is obtained, and greater capacity than can be got from any other Meter in the market. No gas can pass under the valves on any back pressure, as is the case with many other Dry Meters.

To Gas Companies supplying gas through streets with heavy gradients, these Meters are invaluable, as much gas is saved from the low pressure required to work them.

ALL METERS ARE UPHELD FOR FIVE YEARS.

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GASHOLDERS, TANKS, PURIFIERS,

SCRUBBERS, VALVES, EXHAUSTERS, IRON ROOFS, BRIDGES, BOILERS, AND GENERAL CAST AND WROUGHT IRON WORKS.

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They make a speciality of supplying every requisite whatever for Gas-Works, keeping in Stock what are most in request. WOOD SIEVES for Purifiers and Scrubbers, of a superior make.

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DESCRIPTION OF MORRIS & CUTLER'S PATENT CONDENSER.—The Condenser may consist of pipes arranged in tiers, or in any other form most convenient to the site available, each tier being connected with special connections, and containing within same either one or more coils of smaller pipe through which water is passed, being supplied from any convenient source of supply, the water passing in an opposite direction to the gas, so that the coldest water is at the gas outlet. The power of the Condenser can be regulated precisely in proportion to the quantity of water allowed to pass through, which is not in any way contaminated, but simply heated by the hot gas, and advantage can be taken of its being at a high level to carry it to a high-level cistern, from whence it can be used for supply to boiler or any other purpose. The Condenser itself may form the support for a high-level cistern. By an arrangement of valves the water may be shut off, and an air orifice opened, when air will pass through instead of water, or both air and water can be shut off. The power of the Condenser is, therefore, entirely under control. The Condenser may be seen in operation at the Brentford Gas-Works.

For further Particulars, apply to Mr. F. MORRIS, GAS-WORKS, BRENTFORD, or to S. CUTLER & SONS, PROVIDENCE WORKS, MILLWALL (Near the Steamboat Pier), LONDON, E.

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SPECIAL METALLIC OXIDE PAINT,

Largely used by Gas Companies, Corporations, Railway Companies, Ironfounders, and Machinists. It has the following qualifications and properties:—

EFFECTUALLY PREVENTS AND ARRESTS CORROSION.
HAS A FINE GLOSS, AND IS VERY DURABLE.
DOES NOT REQUIRE DRIERS LIKE OTHER PAINTS.
PROTECTS IRON FROM ACTION OF WATER.

IS NOT AFFECTED BY SULPHURETTED HYDROGEN.
FORMS A VERY HARD TOUGH (NOT BRITTLE) SURFACE.
WILL NOT CRACK, BLISTER, OR SCALE
IS NOT AFFECTED BY EXTREMES OF TEMPERATURE.

COVERS NEARLY DOUBLE THE AREA OF OTHER PAINTS.
(7 gallons or 1 cwt. will cover 1211 square yards of Ironwork.)
IS CHEAPER AND MORE ECONOMICAL THAN ANY OTHER.

VICTORIA PAINT WORKS, COLLYHURST, MANCHESTER.

HYDRATED PURIFYING MATERIAL.

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Will be glad to supply the above on the most favourable terms, and to treat, by Purchase or Exchange, for Spent Oxide.

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ALSO PATENT DRY COPPERAS FOR EXTRACTING AMMONIA.

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BY

OXIDE OF IRON.

GAS PURIFICATION & CHEMICAL Co., LIMITED,

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LIMITED,

DISTRICT OFFICE: 97, NEW STREET, BIRMINGHAM; AGENT: W. M'GOWAN,

Supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, &c.

N.B.—The Wigan Coal and Iron Company, Limited, are exclusive owners of the well-known HAIGH HALL AND KIRKLESS HALL GAS COAL COLLIERIES.

GAS COAL. GAS COAL. GAS COAL.

WELLS, BIRCH, RYDE, and CO., Limited,

HOYLAND SILKSTONE COLLIERIES,

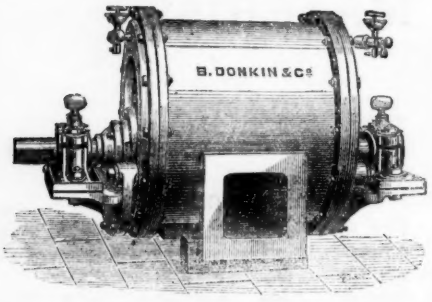
Near BARNSLEY.

This Company is now in a position to raise **2000 tons per day of REAL OLD SILKSTONE GAS COAL.**

"The quality of this Coal for Gas purposes, if equalled, is not excelled by any on record, and the Coke competes successfully with best Durham."—See *Mining Journal*, Aug. 11, 1877.

Prices quoted to any Railway Station, or F.O.B. Hull, Grimsby, Goole, Keadby, Liverpool, and Fleetwood.

Full particulars will be sent on application to above address.



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NEW PATENT GAS-EXHAUSTERS,

For the Manufacture of which

MESSRS. B. DONKIN & Co.

POSSESS THE SOLE RIGHT.

Made with two Outside Bearings and with all the Latest Improvements.

FULL PARTICULARS ON APPLICATION.

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Messrs. B. D. & Co. are also Manufacturers of Steam-Engines and of Improved Gas and Water Valves, &c., &c.

GOLDSMITH'S PATENT SIGHT WATER-LINE INDICATING GAS-METER.

MANUFACTURED BY GUEST AND CHRIMES,

FOUNDRY AND GENERAL BRASS WORKS, ROTHERHAM;

AND 85, SOUTHWARK ST., LONDON, S.E.

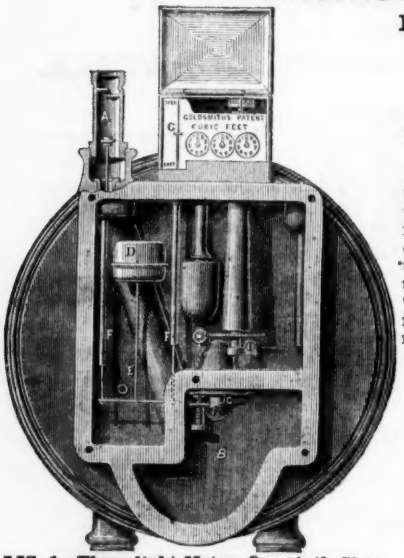

FIG. 1.—Three-light Meter, One-sixth Size.

Fig. 1 is a Meter with front removed to show the arrangement and connection of the Indicator and Valve.

Fig. 2 is front view of Index, with cover up.

The principal object of this invention is to render the water-line in the reservoir at all times visible. It will be seen, by reference to the illustrations, that this is accomplished in the following manner:—On the dial are the words "Open" and "Shut," and attached to the float is the pointer G, which rises and falls with the water-line in the reservoir. If the pointer is at "Open," it shows that the valve is open, and that the reservoir is full. If it is at "Shut," it shows that the reservoir is empty, and that the gas will be shut off.

The following ADVANTAGES will be obvious:—

1. The Inspector can see at a glance if the Meter requires water.
2. No more water than is required need be added, and therefore no water has to run out.
3. The Meter Inspector will be spared a great deal of his most objectionable work, and he will save a great deal of time and trouble.
4. The consumer will not always have to be asked for water, nor will he have to endure the unpleasant smell caused by waste water being run out.

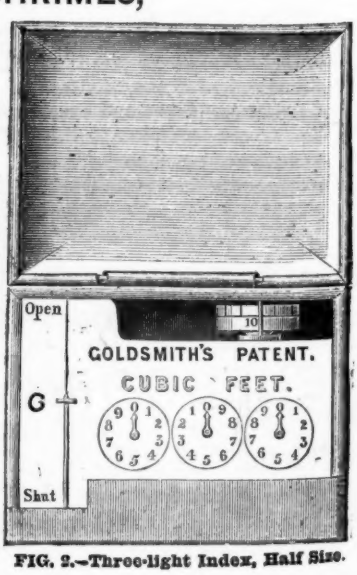

FIG. 2.—Three-light Index, Half Size.

GEORGE ORME & CO.,

ATLAS METER-WORKS, OLDHAM,

MANUFACTURERS OF

WET AND DRY GAS-METERS,

STATION-METERS, GOVERNORS,

PRESSURE AND EXHAUST REGISTERS,

LAMP-METERS IN CAST-IRON BOXES,

And every Description of Gas Apparatus.

JAMES MILNE & SON,

GAS ENGINEERS,

Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,

EDINBURGH, AND

2, KING EDWARD STREET,

NEWGATE STREET, LONDON.

Meter Works in London—2, CROSS STREET, WILDERNESS ROW, E.C.

STATION-METERS GOVERNORS, CONSUMERS METERS, GAS LUSTRES, CHANDELIERS, BRACKETS, &c.,

And every description of Gas-Fittings and Gas Apparatus.

LONDONDERRY GAS COALS

DIRECT FROM THE

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Manufacturers of FIRE-BRICKS, LUMPS, TILES,

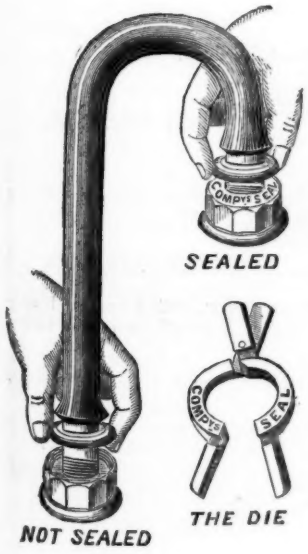
AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

FOULGER'S PATENT

COUNTER-SUNK SEAL GAS-METER UNIONS,

As Supplied to The Gaslight and Coke Company.



These Unions practically place a Gas Company's property under lock and key, by rendering it impossible to disconnect at any joint at which gas could be obtained unregistered, without destroying the Company's seal or signature, whilst a small cover absolutely protects the impression from accidental injury.

A meter having been fixed with one of these Unions on the main-cock, and another on the inlet, a few pinches of specially prepared crushed sealing-wax is placed in the cup, and being melted with a blow-pipe, the wax runs between the reversed threads, the circular tong-shaped die will then give a sharp impression of the Gas Company's title, an operation requiring about two minutes in all to perform.

If heat is applied for the purpose of unsoldering the joints, the wax is instantly fused, and the impression, of course, lost.

Are supplied in all sizes, either as Caps and Linings or Barrel-Unions, and at a small additional cost over existing connections.

For further Particulars, Samples, &c., apply to the Sole Agents,

WIGGINS & RIHLL,

VICTORIA DOCK ROAD, LONDON, E.

C. & W. WALKER'S

WOOD PURIFIER SIEVES,

Which have now been used for fifteen years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.

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DONNINGTON, NEAR NEWPORT, SHROPSHIRE.

FINSBURY CIRCUS, LONDON.

PRICE'S PATENT COKE & COAL BARROW

effecting a great saving of time, labour, and expense.

For particulars, price, &c., apply to Mr. E. Price, Inventor and Patentee, Gas-Works, Hampton Wick, MIDDLESEX.

Prices are Reduced.

SCOTCH CANNEL COALS.

The Subscriber is prepared to contract for the supply of all the principal SCOTCH CANNEL COALS. Prices and Analyses of the various Coals will be forwarded on application.

JAMES M'KELVIE,

CANNEL COAL MERCHANT,

HAYMARKET, EDINBURGH.

Established 1840.

ESTABLISHED IN 1860.

BENJAMIN CARPENTER,

THE ORIGINAL MANUFACTURER OF THE IMPROVED

WOOD SIEVES

FOR

GAS PURIFIERS & SCRUBBERS.

PROVIDENCE WORKS,

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The Dunston Engine Works Co.,

GATESHEAD-UPON-TYNE.

Are the Sole Manufacturers of

Archer's Patent Hoists,

ALSO OF

Archer's Patent Stone Breaker,

AND OF

Archer's Patent Ore Crusher & Pulveriser,

The last-named Machine (without the Pulveriser) makes the best and most durable Coke Breaker.

GRIRDROD'S PATENT

PORTABLE PIPE SCREWING

MACHINE,

For 1 in., 1¼ in., 1½ in., and 2 in. Gas Threads, complete £7 10s.

In use at the chief gas-works, and giving great satisfaction.

For other useful goods, see Bailey's "Illustrated Inventions," post free 3s. 6d.; gratis to ledger customers.

W. H. BAILEY & CO.,

Brassfounders, Gauge Injector and Tool Makers,

ALBION WORKS, SALFORD,

LANCASHIRE.

Gold Medal Awarded, Paris Exhibition, 1878.

THOMAS TURTON AND SONS,

SHEAF AND SPRING WORKS,

SHEFFIELD,

MANUFACTURERS OF

FILES OF BEST QUALITY

FOR ENGINEERS,

STEEL OF ALL DESCRIPTIONS,

SCREW STOCKS, TAPS, AND DIES, SPANNERS, RATCHET BRACES, LIFTING-JACKS, ANVILS, VICES, AND ENGINEERS TOOLS GENERALLY.

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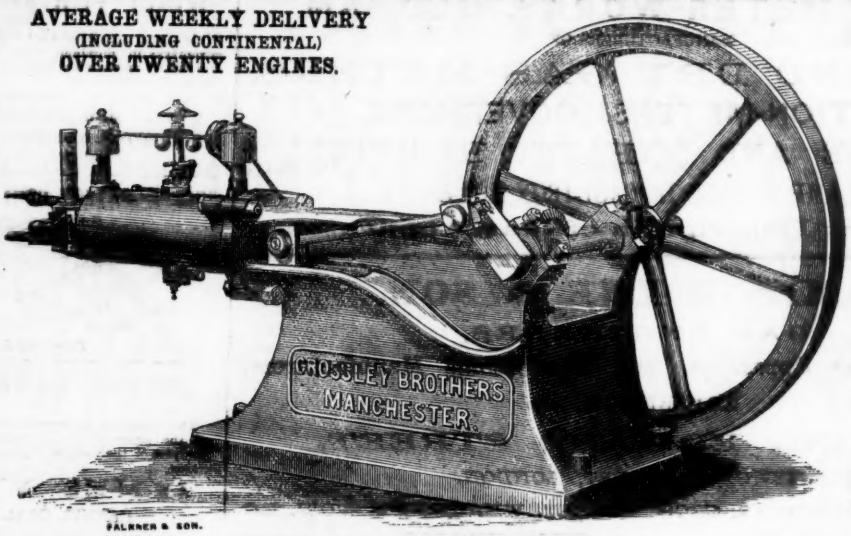
AN ENGINE WHICH WORKS WITHOUT A BOILER OR STEAM

AVERAGE WEEKLY DELIVERY
(INCLUDING CONTINENTAL)
OVER TWENTY ENGINES.

The durability of these Engines is now established by experience, one of them having run night and day at the Hinckley Gas-Works for over Twelve months without any expenditure for repair; this being equal to about 2½ years average work.



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Over 1900 already delivered.

Very numerous Testimonials from Users, including Engineers, Men of Science, and others, on application to the makers.

No trouble with Coal, Ashes, Smoke, Insurance, Water, or constant attendance.

No Glands to pack, or Water Gauges and Steam Gauges to watch.

STARTS AT A MOMENT'S NOTICE.

THE "OTTO" SILENT GAS-ENGINE.

(Otto and Crossley's Patents, 1876 and 1877.)

THEY ARE USED FOR ALL KINDS OF PURPOSES, CHIEFLY FOR EXHAUSTERS, SCRUBBERS, & PUMPS.

DELIVERED IN MANCHESTER. SIZES { NOMINAL HORSE POWER ½ 1 2 3½ 6 8 12 16 / MAXIMUM HORSE POWER ¾ 1½ 2½ 4 9 12 18 24 } OFFERED. CASES NOT CHARGED IF RETURNED FREE

PRICES INCLUDE CAST-IRON STAND, TURNED FLY-WHEEL, AND DRIVING PULLEY; WATER-VESSEL, SEVERAL DUPLICATES, AND GAS-FITTINGS (EXCEPTING METER AND PIPES).

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LONDON HOUSE:
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THE NEW GAS COOKER.

40 PER CENT. OF GAS SAVED.

No. A510 same as our **No. A152,**
But Lined with Patent Non-Conductor.
Will Roast, Bake, and Fry, and with Three Burners for Boiling.

SIZE.
Outside—30in. high, 20in. wide, 20in. deep.
Inside—19½in. „ 14in. „ 17in. „

Price . . . . . **£4 14s. 6d.**

No. A500.
Lined with Patent Non-Conductor.
Is fitted with Roasting and Baking Oven and Four Burners for Boiling.

SIZE.
Outside—34in high, 20in. wide, 19in. deep.
Inside—30in. „ 16in. „ 17in. „
Hot Plate—24in. by 23in.

Price . . . . . **£7 10s. 0d.**

No. A505.
Same as with Roasting and Baking Oven, a Broiler or Toaster, a Chop Griller, a Hot Water Boiler, and Three Burners for Boiling.
Hot Plate—26in. by 24in.

Price . . . . . **£9 15s. 0d.**

These Cookers are jacketed, on the sides, top, and door, with a new and very efficient non-conducting material, by the use of which a **saving** of gas to the extent of **40 per cent.** is effected.

Gas Companies who are selling or hiring stoves should see these stoves. Catalogues and particulars on application to

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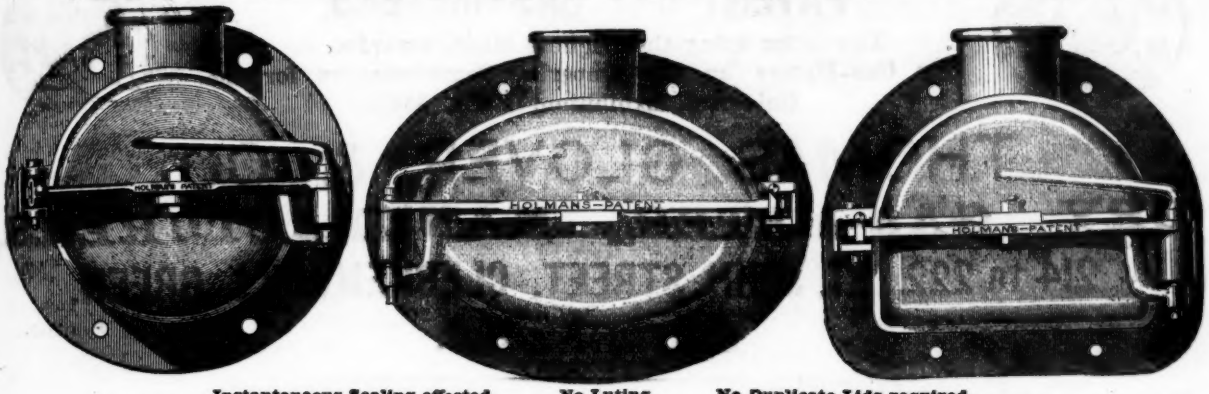
SOLE MAKERS OF MORTON'S PATENT SELF-SEALING RETORT-LIDS

WITH HOLMAN'S PATENT ECCENTRIC FASTENINGS,

Anti-Friction Catches, and New Self-Adjusting Cross-Bars.



Instantaneous Sealing effected. No Luting. No Duplicate Lids required.

Holman's New Self-Sustaining Cross-Bar ensures freedom of Joint, and maintains parallel position of the Lids.

Since their introduction in 1869, these Patent Retort-Lids have been thoroughly tested, being now in use in nearly all the principal Gas-Works in London and the Provinces.

T. B. and H. are now making the "Morton's Self-Sealing Lid" of the SAME FORM OR SECTION AS THE RETORT (see Illustrations above), as well as bringing the Mouthpiece from the D or Oval at back to Circular in front, as heretofore.

D and Oval Morton's Lids are working satisfactorily both in this country, on the Continent, and in the United States of America. Among others they have been adopted by the following Gas-Works:—

The Gaslight Company's Works, Fulham; Ditto, Bromley-by-Bow; Ditto, King's Cross; Ditto, Shoreditch.
And also in the Gas-Works at Richmond, Maidstone, Gloucester, Glasgow, Portsea, Roubaix (France), The Hague (Holland

HUNT'S PATENT EQUILIBRIUM GAS-GOVERNOR.

In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communications being avoided by placing the Lever or Radius Arm (shown in the drawing) inside the Valve-Chamber upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.

The principal advantages of this arrangement over the ordinary form of Governor are as follows:—

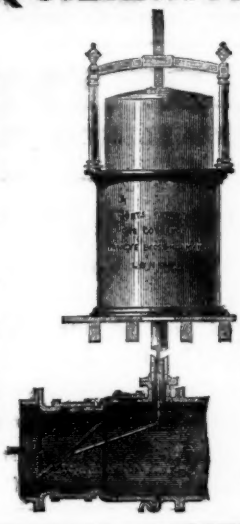
Its sensitive action prevents oscillation.

It is self-adjusting—*i.e.*, it maintains a steady pressure under variations of inlet pressure or a fluctuating consumption.

The inlet to Gasholder being contracted to the smallest possible dimensions, all danger from leakage through insufficiency of seal, tilting, &c., is entirely avoided.

The valve portion being separate from the holder, it can be handled and fixed like an ordinary Slide-Valve direct in the main; and the holder can be placed at an convenient distance immediately above it. The cost is thus materially reduced, and the inconvenience of heavy lifts done away with.

There are no working parts likely to get out of order.



These Governors have been adopted by many leading Gas Companies, among whom are the following:—

The Gaslight and Coke Co. (9), The London Gas Co. (3), and at Abergavenny, Arundel, Birmingham, Cannes (France), Devonport, Dursley, Exeter, Guernsey, Halesowen, Mentone (France), Monmouth, Newcastle-on-Tyne, Oxford, Plymouth, Rochdale, Windsor, &c.

TESTIMONIAL.

The Gaslight and Coke Company,
9, Water Street, New Bridge Street,
Blackfriars, E.C., Feb. 27, 1878.

MESSRS. TANGYE BROTHERS AND HOLMAN.

Gentlemen,—The two 24-inch and three 36-inch Hunt's Equilibrium Governors supplied by you, and fixed in the valve-rooms at Whitechapel, Goswell Road, and Blackfriars, are working very satisfactorily.

Yours truly,

(Signed) JOHN JOHNSON.

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Diameter of Steam Cylinder.	Diameter of Water Cylinder.	Length of Stroke.	Gallons of Water per Hour, Approximate.	Reduced Prices.
3	1½	9	450	£16
4	2	9	815	18
5*	2½	12	1,250*	21
5*	3	12	1,830*	22 10
4	4	12	3,250	25
6*	4	12	3,250*	30
5	5	12	5,070	32 10
7*	5	12	5,070*	40
6	6	12	7,330	40
8*	6	12	7,330*	50
7	7	12	9,750	50
10*	7	12	9,750*	65

In use in a Hundred Gas-Works in the United Kingdom for Pumping Ammoniacal Liquor, Water, or Tar.

Messrs. Burt, Boulton, and Haywood, Manufacturing Chemists, have over FORTY "Special" Steam-Pumps in use at their several large Tar-Works.

Two Hundred Sizes made. Those in Table opposite are the leading Sizes for use in Gas-Works and Chemical Works.

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FULL PARTICULARS, ESTIMATES, CATALOGUES, ETC., ON APPLICATION.

London, 1851. New York. 1853. Paris, 1855. London. 1862.

Dublin, 1865. Paris, 1867.

The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters bv the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

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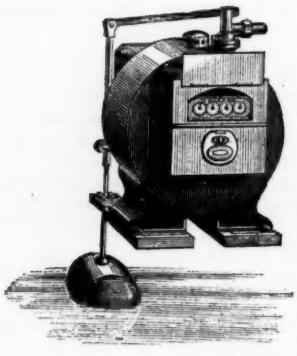
THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS.

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

WILLIAM PARKINSON AND CO.

(ESTABLISHED 1816.)



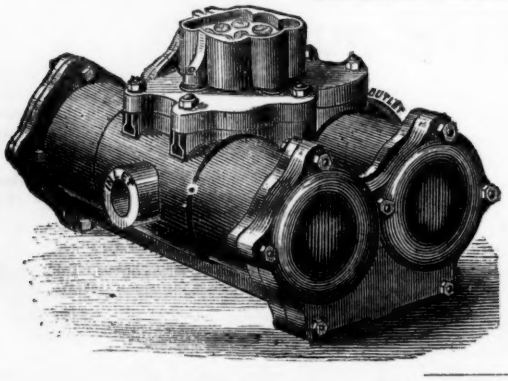
SOLE MAKERS OF THE LOW-PRESSURE WATER-METER.

This Meter will register with perfect accuracy, either at full speed, or with a few drops only passing through it.

It must be placed over the cistern to be supplied, and the water, after being measured, will fall from the outlet into the cistern below.

Each Meter is fitted with a ball-valve, so made that it can be adjusted to shut off the supply at the inlet when the water reaches any required height in the cistern.

The 100-gallon Meter is fitted with a cistern holding about three or four gallons, and may be fixed inside a house, free from the effects of frost, and requires no attention after once being fixed.



HIGH-PRESSURE WATER-METER.

The Union Water-Meter, of which an external view is here given, is of the positive class—*i.e.*, a Meter in which a measuring chamber is alternately filled and emptied, each filling being duly recorded. It is formed of two cylinders, with double pistons in each, having a rotary-valve of peculiar construction, which is worked from cams on the piston-rods.

It is claimed for this Meter, among its advantages over other Piston Meters in use, that it is extremely small and compact, and that its durability and accuracy have been proved by the fact that upwards of 20,000 of them, of various sizes, are in successful operation in the States. In England the instrument has been fully tested by several Water Engineers of eminence, and pronounced by them as a reliable and satisfactory register of water supply; it is also economical in cost.

ALL METERS are TESTED with 60 lbs. pressure before they are sent out.

COTTAGE LANE, CITY ROAD, LONDON, E.C.

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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

W. E. S.—*If it be an ordinary allotment of shares, a letter or form of renunciation will be quite sufficient.*

In consequence of pressure on our space to-day, we are reluctantly obliged to hold over till next week much interesting matter already in type. Among others, reports of the meetings of the Bury St. Edmund's, Cork, and Croydon Gas Companies, the Colne Valley Water Company, the Bolton Corporation, &c., &c.

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, AUGUST 19, 1879.

Circular to Gas Companies.

The Corporation of Liverpool have commenced their experiments with the electric light, at the Picton Reading-Room, and so far, according to newspaper account, the results show greatly in favour of electricity over gas. The report, however, does not give us all the particulars we should be glad to have. The Gas Company, it is stated, poured a flood of light on the scene; but it was said to be expensive. Electricity, we are told, gave an admirable light; whether equal to that supplied by gas, it is not said; but it is reported that the cost of the former was only one-third that of the latter. This experiment is only a small matter; but it deserves to be remarked upon. There is, of course, a prospect that electricity may come into some sort of use as an internal illuminant, but we are not at all afraid of competition with it.

Timid gas shareholders, if there are any such, may peruse with satisfaction the able address of the Governor of The Gaslight and Coke Company at the half-yearly meeting, held on Friday last. This Company have experimented with the electric light, and, so far as the results they have obtained were concerned, it was proved conclusively that, both as regards economy and illumination, gas can well hold its own. The Company have gone a step farther, and have endeavoured to persuade Local Authorities to adopt improved means of lighting wide thoroughfares by the use of large gas-burners. These experiments, as our readers will see by the accounts which we publish elsewhere, have been carried on entirely at the expense of the Company. They have not cost much, it is true, and the carping critics who object that the money eventually comes out of the pockets of the consumers, have but a small grievance. The answer to it is that the public had the benefit of the experiment and that no one raised any complaint. It is much to be regretted that the trial of the improved gas lighting in Waterloo Place was stopped so soon. The motives which actuated the Vestry of St. James's, Westminster, in putting so sudden an end to the experiment, can only be guessed at. They, no doubt, surmised that the public who use that important thoroughfare would presently demand a continuation of the light, the charge for which would have to be defrayed from the parish rates. Some would, no doubt, found an argument on this in favour of absorbing the whole gas supply under some municipal body, who would be able to charge the inhabitants of Hampstead the same amount for public lights as they charged those in the neighbourhood of Piccadilly. But the day has not yet arrived for this, and, probably, never will arrive. Local bodies must continue to discharge their own liabilities, and we may say in a few words that the Chartered Company acted perhaps somewhat Quixotically when they attempted to persuade the Vestry of St. James's to adopt an improved mode of public illumination.

We must turn for a few moments to the accounts of the Company, which will be found in detail in another place. The Governor referred with satisfaction to the circumstance that the gross rental during the past half year had been higher than in any similar period. To receive more than a million sterling in six months for the supply of gas, is a fact unprecedented in the history of gas supply, and it is natural that special reference should be made to the fact. The undertaking must of necessity go on increasing in size and importance, and the revenue which now excites something like wonder will presently appear to be but a small affair. Although this large amount has been obtained for gas, it must not be supposed that everything has gone well with the Company. Residuals, and especially coke, have not produced the amounts which might have been expected. Coke is, unfortunately, a drug at Beckton, and it is, we fear, likely to remain so for some long time to come. It may be broken, and its sale undoubtedly increased by this means; but breaking costs money, and the operation leaves a residuum comparatively worthless. Beyond all doubt it would be greatly to the advantage of the Company if they would engage in the sale of heating apparatus for the economic consumption of coke. Cheap as the fuel is, it is only the very poorest classes who are fully alive to its importance. It would be to the interest of all Companies to promote its use among middle-class consumers, who would pay a better price and use much more. It is absurd, however, to criticize the actions of the Directors in this matter. They are doing their utmost to get rid of the vast accumulations which they have on hand, and we can only wish them success in their efforts.

We must also refer to tar, on which there has also been considerable loss. That the working up of this residual will eventually prove highly profitable to the Company, we have no doubt whatever; but at present it must be admitted that the state of trade is against a profitable exploitation. The aniline business is dull, and benzene does not command a ready sale at remunerative rates. What are called the disinfecting materials which are to be obtained from coal tar, want a sharp outbreak of cholera to stimulate their sale; but the water supply of the Metropolis is so excellent, that we do not expect to have another epidemic of cholera. The manufacture of sulphate of ammonia, it seems, has been carried on with much success; but the unfortunate agriculturist, we hear, is not now in a position to purchase expensive manures. The South American war ought to largely advance the price of our manufactured manures; but, to say the truth, we have not carefully watched the state of the markets.

As regards the appropriation of the large balance of £101,613, which remains in the hands of the Company after the payment of a ten-and-a-half per cent. dividend, it may be safely left to the discretion of the Directors. We are strongly of opinion that their best policy will be to increase as they can their reserve-fund. The halcyon times through which the Company are now passing may not, and probably will not last for ever. Coke, as was very properly pointed out by one of the speakers at the meeting, may become an increasing difficulty, and the future profits of the Company may, in consequence, become further abridged. At the present moment, however, all doubts as to the success of the undertaking may be set at rest. Difficulties in the management will, of course, arise; but, happily, the Chartered Company have among their Directors and Managers a class of gentlemen fully equal to grapple with them.

As we reported last week, the Gas Committee of the Corporation of Leeds resolved to recommend the Council to reduce the price of gas from 2s. 6d. to 2s. 2d. per thousand feet, and their recommendation was agreed to at a meeting of the Town Council held last Wednesday. A little opposition was made in Committee, a member wishing that, in place of reducing the price of the gas, money should be expended in

increasing the illuminating power and reducing the amount of impurities. Now, Leeds gas has a fair illuminating power, and as regards impurities, it is almost equal to any supply of the same magnitude in the kingdom. The Corporation may rest well assured that whatever can be done to improve the quality of the gas, will be effected by their Engineer, ably seconded in his efforts by the Gas Committee.

Memory is sometimes treacherous, and we may be forgiven for having, when referring to the Salford Corporation gas accounts last week, forgotten that Mr. S. Hunter, the Engineer of the works, has—by the publication and distribution of his Lecture on Coal Gas (which we noticed at the time it first appeared), and in other ways—taken considerable pains to instruct consumers in the selection of good burners and fittings. The proceedings which gave rise to our comments show, however, that his work is not yet finished, nor will be, so long as Town Councillors speak of "bad" gas blackening ceilings.

Mr. Esplin's paper, read at the recent meeting of the North British Association of Gas Managers, and published in the last number, affords a suggestion of much importance. It would undoubtedly be to the advantage of Gas Companies if no meter-rents were charged. The grocer does not directly charge for the use of his scales, nor does the publican for the use of his measures; nor ought Gas Companies for the use of the meters which measure the commodity they supply. This matter cannot, however, be dismissed in a few words, so we must leave further notice of this interesting paper, as also of that by Mr. D. Terrace, on "Working Statistics," in our present issue, till another occasion.

The paper read by Mr. M'Gilchrist, which we also published last week, presents many points of interest. The circumstances affecting the price of gas are not very numerous, and are sufficiently alluded to in the paper. The amount of capital engaged, especially if the undertaking belong to a Company, is, of course, of primary importance. In the case of a Corporation, the effect of large capital is scarcely less detrimental to the consumers. In neither case can a manager's best efforts affect the cost. He produces the gas, we may be certain, at the lowest possible cost; but the charge for it is settled by considerations which lie beyond his control, and, we may say, in some cases, beyond his cognizance. Mr. M'Gilchrist put this very well when he urged that the capital employed is the prime factor which regulates the selling price of gas. If in Dundee it requires 1s. 1d. per thousand feet of gas sold to pay the annuities, and at Greenock the same capital charges have to be paid, there must be something else which makes it necessary to charge in one case 3s. 11d. per thousand feet for 29-candle gas, and in the other 4s. 7d. for 26-candle gas. This is a matter which may be susceptible of easy explanation, but we confess that just now it is not clear to us. As regards meter-rents, we have intimated above that both Corporations and Companies would do well to abolish them altogether. Mr. M'Gilchrist appears to be of opinion that Corporations can always supply gas cheaper than Companies. This we believe not to be the fact, and the very case quoted of the Galashiels Gas Company is, we think, decidedly against him. On this point, however, much will have to be said and written. It will form a very excellent topic to occupy what is sometimes called the "silly season," but in which some very useful problems are worked out by correspondents in the Press.

Mr. Thomson, of Glasgow, gave an interesting account of a gas-compressing and condensing apparatus, and its use in obtaining from shale gas a quantity of light volatile oils, which may prove of value in increasing the illuminating power of poor coal gas. It is rather a pity that Mr. Thomson did not give a more complete description of these volatile oils; their specific gravity, for example—we do not care here about their composition. So many have been tried for enriching coal gas, and so many have been the failures from the non-evaporation of the material, that we should have been glad to have had more specific information respecting the oils obtained by compression.

Writing about this matter, we cannot help quoting from an American paper that the production of petroleum is enormously increasing in the Pennsylvania district. New wells are continually being sunk, and it is said that from seven to ten thousand barrels of oil are daily allowed to run to waste. A further thing strikes us at the last moment. The Messrs. Pintsch make from the distillation of shale oil a gas for illuminating railway carriages. When made, they submit it to pressure; but we are informed that in this process very little oil is obtained.

In his paper on "The Automatic Pressure Changer," read by Mr. W. Cowan, of Edinburgh, the author described two most useful amplifications of the purposes to which this ingenious apparatus can be applied. It is well known that, for the regulation of pressures in rising mains at a distance from the gas-works, differential governors are generally employed. It will readily be seen, however, that by the application of the Changer, this need no longer be the case, but that the ordinary station governor, with the superior advantages attending its use, may now be adopted where the attendance of a man to vary the pressure would be both inconvenient and expensive. Again, in the instance of governors fixed in such a position that they are liable to be influenced, or their action counteracted, by pressures from other sources of supply; or where the indications of a pressure register are nullified from the same cause, the Changer, by having an air-holder attached to it to actuate its own holder, is free to perform its functions independently of the counteracting pressure before referred to. This is accomplished in a very ingenious manner by a modification of the taps, and by other simple means described by the inventor. The present paper, which differs materially from the one presented at the Newcastle meeting, is well worthy of attentive perusal.

Water and Sanitary Notes.

THE Indemnity Bill of the Metropolitan Board of Works of course received the Royal Assent on Friday last, and now the members of the Board may sleep peacefully without any fear of surcharges. As we have said all along, the Bill was certain to pass in the next, if not the present session, and it is just as well to get the business over.

On Wednesday last, Mr. Fawcett, with the assent of the Government, opened, in the House of Commons, his indictment against the Metropolitan Water Supply. The resolution which he proposed will be found in another column. It will be seen that it embraced four principal points. The first was whether the quality of the water supplied is good. On this there is very little to be said, for successive Commissions have reported that the source of the water supplied to the Metropolis, and its quality, are beyond all question. Mr. Ayrton's Committee, who took voluminous evidence, reported that "Your Committee are satisfied that both the quantity and "quality of the water supplied from the Thames is so far satis-"factory that there is no ground for disturbing the arrange-"ments made under the Act of 1852, and that any attempt to "do so would only end in entailing a waste of capital, and an "unnecessary charge upon the owners and occupiers of pro-"perty in the Metropolis." The Duke of Richmond's Commission, which sat subsequently, and examined experts of all kinds, also reported: "That the Thames water has many "good qualities which render it peculiarly suitable for the "supply of the Metropolis, and which give it, in some respects, "a superiority over the soft waters usually obtained from high "gathering grounds." So much, then, for the opinions of careful investigators as to the quality of the Metropolitan supply. Mr. Fawcett's next point was the effect of the quality of the water on the material condition of the community. On this matter, much of what we may call rubbish has been talked. Cardinal Manning and his friends would have us believe that if what they call good water could be obtained, temperance would be general and drunkenness the exception. This is a pure delusion. The water now supplied to the Metropolis is good enough for Cardinal Manning and his followers, and if it were imbibed universally nothing but good would result. But, unfortunately, the working man, who is so much sympathized with, requires a fillip to cheer his jaded spirits and revive his exhausted frame. He finds it, it may be, in a little fourpenny ale, or possibly in some gin. Whether he is the worse or not for these beverages, taken in moderation, we shall not undertake to say. We simply mention the fact that the man has a longing for those stimulants, and thinks himself the better for the use of them. It is much worse when we come to the case of women, who ought in all cases to be water-drinkers, but are perhaps the worst subjects with whom temperance advocates have to deal. What kind of water would induce a middle-aged woman, who has once become addicted to intoxicating liquor, to adopt temperance principles, we should be very glad to know. We very much doubt whether the condensed dew of Hermon, if it could be provided for our use, would wean her from her passion for spirits. Cardinal Manning and his friends know this very well. The point which they urge has never been investigated by any responsible Commission. The clergyman, when talking to a drunkard, is, no doubt, often told that if the latter could get good water he should prefer to drink it rather than

the noxious stuff which he obtains at the public-house. But how about Liverpool, Manchester, and Glasgow, in which the water supply is supposed to be unexceptionable, but where drunkenness is much more prevalent than in London? These are questions to which we should like Cardinal Manning and his friends to reply.

As regards the provision of water for the extinguishment of fires, which means, of course, salvation of life, nothing can be more certain than that the Water Companies have fairly done their duty. Ever since the Act of 1871 was passed, efforts have been made, with much success, to bring the Metropolis under a constant supply, so that at the present moment almost one-fourth of the area supplied is furnished with constantly-charged mains, which deliver into the houses water without cessation. That the inevitable turncock has sometimes to be sought for, is mainly the fault of the Metropolitan Board of Works, for the Companies offered to place one at every fire-engine station, and pay rent for him, but the Board declined. Apart from this, however, it is well known that, even under the intermittent system, the supply of water in the case of fires is nearly always ample, and promptly furnished. Mr. Fawcett made an exaggerated statement when he said that it was generally half an hour before water could be obtained at a fire. When the hydrant system is fully developed, there can be no doubt that a most effective provision will be made for the protection of property and life in the Metropolis. The Corporation of the City of London have not exactly taken the lead in adopting the hydrant system; but, at all events, in the City, the scheme has reached its fullest development, and, we may take it, with the happiest results. Every street in the City is now supplied with a main under high pressure, and a hydrant ready for immediate use. This has been done by the Corporation of their own free will, and with their own private funds, without the smallest assistance from the Metropolitan Board of Works.

A question which, of course, cropped up related to the adequacy of the supply. This is easily answered by the monthly returns of the Registrar-General, which show that, on the average, the daily supply to each inhabitant of the Metropolis is about thirty gallons. If this be not an adequate supply, we should like to know what would be. It is a fact well known to every one who has investigated the matter, that the bulk of this water is simply wasted. In the houses of rich and poor alike the water dribbles away in consequence of carelessness and the use of bad fittings. There can be no doubt that a constant supply would prove a remedy for this waste; that is, if the Companies exercised a strict control over taps and waste-pipes. They have the power to do this, but its enforcement would excite a good deal of obloquy and opposition. Nevertheless, it must be admitted, as we have said before, that a constant supply is an absolute necessity in the Metropolis. Two happy results would follow its adoption. In the first place, every house would be furnished with exactly what the occupants require; in the next place, consumption would be largely diminished, to the great advantage of the Companies. If, as in the case of Norwich, which is under a Company, consumption under the constant system could be reduced to about sixteen gallons per diem per head of the population, it follows that the filtering apparatus of the Metropolitan Water Companies will be adequate to give much purer water than is furnished under the rapid system which they are now compelled to adopt.

Something must be said concerning the cost of water in the Metropolis, about which many delusions are prevalent. It is a common supposition that the Water Companies, who have the power to charge upon rateable value, enforce their rates up to the hilt. This is not correct. There is not a Company in the Metropolis who make a charge anything like what might be levied. We need not go far for an illustration. When the recent re-valuation was made in the City of London, a great outcry arose in consequence of an erroneous supposition that the New River Company would increase their charges according to the new valuation. But what are the facts of the case? The New River Company in the City of London charge on an average on one-third only of the annual value, and, in fixing this annual value, they have had regard to the circumstances of occupation and water consumption. As Mr. Sclater-Booth showed, the complaints against the charges for water in the Metropolis are greatly exaggerated. It is a statement frequently made by people who ought to know better, that the people of London are charged more for water than the inhabitants of Manchester and Liverpool, both supplied by Corporations; but it is not so.

We cannot help thinking that the accusations brought against the Water Companies by the honourable member for Hackney were satisfactorily disposed of. The supply may not be all that can be desired, but it is beyond doubt excellent in quality and ample in quantity, and at the same time moderate in cost. So much was admitted by one or two of the speakers who followed Mr. Fawcett in his arguments against the Water Companies. In fact, it must be acknowledged that the Companies came out of the ordeal much better off than was expected. We do not pay much attention for the moment to Mr. Cross's promise to have the whole condition of the London Water Supply investigated, before Parliament next meet. However, the Home Secretary is usually a man of his word, and the distinct promise he made was sufficient to satisfy Mr. Fawcett, who withdrew his motion.

Now will come the question as to the constitution of the Commission who are to inquire into the subject, and we must confess that we look with some alarm upon the possible results of their deliberations. We can fancy at least half a dozen gentlemen who may be said to have been water agitators all their lives, and who are possibly indulging hopes that another Commission may give them the opportunity of publishing and, if possible, carrying out their fanciful schemes. We sincerely hope that we shall not see the name of any of these gentlemen on Mr. Cross's Commission. The question has to be investigated from a perfectly novel point of view, and requires a new set of men to consider what is best to be done for the benefit of the Metropolis. As regards the Water Companies, we think they look on too supinely. Now is the time to take action, if their interests are to be efficiently protected. We do not again suggest amalgamation, although the matter is well worth consideration. That any great amount of economy could be expected for years to come is purely conjectural. Mr. Fawcett, we rather think, following Mr. Bateman, sets it down at £100,000 a year; but, in all probability, nothing like this economy would result. Upon one point, however, there can be no question. The combination would greatly facilitate the introduction of the constant system, which so many desire. Whether this would bring with it all the benefits looked for and expected by the public may reasonably be doubted. If we look round, we do not find that other large towns liberally supplied on the constant system are more healthy than London; indeed, in several, such as Liverpool, Manchester, and Glasgow, the death-rate considerably exceeds that of the Metropolis. As we have repeatedly said, water has nothing to do with disease and the death-rate. The President of the Local Government Board has provided us with some statistics which we asked for—viz., the rate of mortality in the districts supplied by the eight Water Companies. Curiously enough, we find that in the district supplied by the Kent Water-Works Company, with the pure water which Dr. Frankland is always praising, the death-rate is almost the highest in the Metropolis—viz., 21·1; while in the Grand Junction Company's district, supplied with water taken from the Thames, the average annual rate is only 18·6 per thousand. We know very well the reason for this difference. Within a part of the former Company's limits resides a crowded population, badly housed, and perhaps not too well fed; while the latter furnish water to a district more open, and inhabited by a better class of people. Here, for the present, we must leave this topic, simply commending to the attention of our readers the report of the Local Government Board on the Metropolitan Water Supply, which pressure on our space compels us to hold over till next week.

As we have anticipated, opposition is already growing up to the water scheme of the Liverpool Corporation. The Severn Navigation Commissioners, have taken the opinion of Mr. J. Fowler, C.E., as to the possible effects of the scheme on the navigation of the river; the Town Council of Shrewsbury are watching with great anxiety the action of the Liverpool Town Council; and the citizens of Worcester are fearing a great curtailment in their supply of water, and great deterioration of the quality. Probably many erroneous notions are prevalent, as is always the case, upon the effect on the stream even in a dry hot summer. The river, we think, will never, as one of the speakers at Shrewsbury said, become a "muddy "ditch," even if Liverpool took twice the quantity of water which the Town Council propose.

SALE OF CHATHAM AND ROCHESTER WATER COMPANY'S SHARES.—At a recent sale by auction of shares in this Company, the £5 shares fetched the high price of £10 6s. each.

LLYNVI VALLEY GAS COMPANY.—The half-yearly general meeting of this Company was held at Maesteg, on the 11th inst.—Lieut.-Col. Turberville in the chair. The Directors report stated that the balance at the credit of revenue account was £284 3s. 4d., and would admit of a dividend at the rate of 6 per cent. per annum, and leave a balance of £8 3s. 4d. to be carried forward. Owing to the long-continued depression of trade, the quantity of gas consumed had very much decreased, and the Directors had had to make several reductions and alterations to meet their reduced income. The report and accounts were unanimously adopted, and the usual compliment to the Chairman terminated the proceedings.

PARLIAMENT AND THE LONDON WATER COMPANIES.

On more than one occasion we have pointed out that the supersession of the London Water Companies properly involves a change in the local government of the Metropolis. We urged this view on the attention of the Metropolitan Board, so that the members of that body might be brought to consider their own risk when venturing to attack the present custodians of the water supply. Our anticipation is sufficiently verified by the statements of the Home Secretary, in the debate of Wednesday last, upon Mr. Fawcett's motion. The Government, as represented on that occasion by Mr. Cross, have now seriously engaged to enter upon the question of the water supply of the Metropolis. Something tangible and momentous is to be proposed by the Government, after an interval for investigation. What the scheme is to be, not even Mr. Cross himself can say at present; but one thing is clear, that, both in the opinion of the House of Commons and the Government, the Metropolitan Board is "an unfit "body" to be entrusted with the functions now discharged by the Water Companies. Mr. Fawcett recognized this fact in the course of his speech, and made some kind of reference to it in his resolution. His motion was—"That, in view of "the fact that the Metropolitan Board of Works has been "unable to pass any measure dealing with the water supply "of London, this House is of opinion that it is a subject "which ought, without delay, to be dealt with by the "Government."

Parliament is evidently puzzled when looking round to see who are the parties to be entrusted with the supply of water to the Metropolis. The Companies are to be superseded—but by whom? Not by the Metropolitan Board; and, of course, nobody dreams of the Corporation. Is there to be one great Municipality, absorbing the City, and extending far into the suburbs? One reason why Mr. Cross rejects the Metropolitan Board from his embryo plan is, that the Water Companies supply an area which reaches far beyond the limits of the Metropolitan district. Mr. Sclater-Booth felt this difficulty perhaps more forcibly than Mr. Cross. Thus we find the President of the Local Government Board stating that one of the great difficulties of the question is that the area supplied by the Water Companies extends so far beyond the area of the Metropolis. The Metropolis, said Mr. Sclater-Booth, is really not one-quarter of the size of the districts which the Companies have control over; and, therefore, it is extremely difficult to combine a unification of the Water Companies with any Municipal Authority within the Metropolitan area. Mr. Fawcett also saw the rock ahead, and acknowledged that the most difficult part of the problem was that which related to the Authority to whom the water supply should be entrusted. Some of his friends had asked him to wait for the creation of a new Municipality. "We might as well wait for the Greek Kalends," said the member for Hackney. Moreover, he was not sure if, with one great Municipality, the work would be done as well as by a division of labour. The work would be too large. The Metropolitan Board failed to engage his confidence, partly because its area was too limited, as already stated, but also because it was not elected directly by the ratepayers, in addition to which the Board was already overworked, and it would be most unwise to throw on it this additional duty. What, then, was to be done? On this point Mr. Fawcett was most generously indefinite. He did not, he said, want the House to tell the Home Secretary he must do this work in one way rather than another. In framing his resolution, he had carefully worded it so as not to ask the House to express itself in favour of any particular scheme. So far as concerns the best method of getting rid of the Water Companies and putting somebody else in their stead, the House gave the Home Secretary a general injunction to "Find out." Mr. Cross promised to do his best for that purpose, and Sir Charles Dilke declared the statement of the Home Secretary to be "altogether satisfactory." Mr. Fawcett withdrew his resolution, and the public are left with the expectation that the Government will accomplish something very wonderful in respect to the water supply of London.

Seeing how difficult it is to supersede the Metropolitan Water Companies, or even to conceive of a plan by which that result may be accomplished, we wonder it does not occur to some people that London is greatly indebted to the Companies for performing a task to which the Local Government of the Metropolis is confessedly unequal. After all that has been said against the London Water Companies, Parliament at the present moment prefers them to any existing body. If the Companies are to be superseded, a new authority must be created. Mr. Fawcett and others repudiate the idea of waiting for a revolution in the local government of the Metropolis, and yet nothing less seems likely to be sufficient for the purpose. If the Corporation and the Metropolitan Board are to continue as before, there must be a species of Commission to take charge of the water supply, and, so soon as this is proposed, we shall see the Corporation and the Metropolitan Board fighting the battle of the Water Companies by vehemently opposing the creation of such a rival. The Metropolitan Board was brought into existence for the purpose of draining London. Why should another body be created for the purpose of managing the water supply? There is this reason in favour of a new authority—namely, that the Metropolitan Board cannot possibly perform the work requisite. In the management of the water supply the Board must be re-constituted if it is to undertake this new duty, and its jurisdiction must be extended. To such a proposal the Corporation would probably offer objection, and it remains to be seen whether such a scheme will be launched by the Government.

The plain and evident fact, as disclosed by the debate in Parliament, is this—that the Local Government of the Metropolis, as it at present exists, is too weak to undertake the work of the Water Companies. The latter have carried out a great enterprise, and occupy a position which is found to be far more onerous and honourable than was supposed. They have performed a task which no local authority was able to undertake, and now that the whole machinery is in full operation, nobody can be found to whom Parliament would willingly transfer the affair. In their own particular sphere, the London Water Companies are an age in advance of the Local Government of the Metropolis. The latter system must either be re-modelled or receive a powerful auxiliary, before the Water Companies can be set aside. *The Times*, in writing on this subject, contends that "we ought not to create a water "supply authority for London side by side with the Metro-"politan Board of Works, unless the latter body is clearly "incompetent to undertake this new duty in a satisfactory "way; and if this is the truth, we ought then to reform the "Metropolitan Board of Works, so as to make it adequate for "this, as for other Metropolitan purposes." *The Times*, like the speakers in the debate, is constrained to admit that "the "real difficulty in the settlement of the water supply of "London will probably be found in the determination of the "body charged with its completion." After referring to "the "many ingenious suggestions" which have been offered for introducing a fresh supply, *The Times* remarks that the Home Secretary "may probably review" these schemes during the recess; but, we are told, "he will be more occupied with "the consideration of the question, who should be charged "with the care of the water supply of the Metropolis." Looking at the general tone of the debate in the House, we observe that the question as to the quality of the water was in a great measure subordinate to other considerations. Mr. Fawcett, in his opening remarks, said he believed he should be able to show conclusively that London at the present moment was suffering far more from defects in the mode of supply than from defects in quality. Going on to refer to the two opposite opinions as to the character of the London Water Supply, as expressed by the Rivers Pollution Commission of 1858 and the Water Supply Commission of 1866, Mr. Fawcett said he was bound in fairness to say that he thought the opinion he had last referred to was confirmed by a return which he thought deserved the very careful attention of the House. The opinion in question was that "if the Thames water were properly "filtered, it might be made suitable for all dietetic purposes." The return which Mr. Fawcett cited as confirming that opinion was drawn up by Dr. Frankland himself. In that document—which was one of Dr. Frankland's monthly reports, the supply furnished by three of the London Companies was pronounced unfit for dietetic purposes, while the water furnished by two other Companies was declared to be of a very superior quality. As all the five Companies drew their supply from the same source—the Thames—Mr. Fawcett argued that the unwholesome water owed its inferiority not so much to the source whence it was derived, as to the fact that it was badly stored and imperfectly filtered.

Taking this view of the matter, Mr. Fawcett's programme was that the Government should first consider how to improve the mode of supply, and, when that was done, proceed to perfect, as far as possible, the sources whence the supply was taken. The improvements demanded by Mr. Fawcett consisted in a constant supply at high pressure; the water being also effectually filtered, and the charge reduced. There appears to be no complaint that the aggregate quantity of water is deficient, though it is contended that in some cases

the supply is scanty, partly owing to its intermittent character and partly in consequence of insufficient pressure. The average quantity of water per head per diem is confessedly large, and we find it alleged that there is something extremely wasteful in the present system of supply. Thus, it is admitted that the Companies give London a liberal supply of water, and they are blamed by some parties for encouraging an extravagant and wasteful misuse of the liquid treasure. The fault, however, leans to virtue's side, and the accusation is one which protects the Companies against a much worse indictment. Water enough goes into London; the only question is as to whether the mode of supply may not be improved. As for the quality of the water, if it can be made good in one case, it can be made good in all. The Thames water should not be taken in during flood, it should be allowed sufficient time to subside, and it should be filtered at a rate that is not too fast. Finally, there is the constant service, so as to prevent the evils of storeage in private dwellings, and there is the demand for a cheap supply. To gain these ends, what is to be done? Supposing the Water Companies to be dispossessed, and the whole affair placed in fresh hands, it is certain that any contemplated measures for the improvement of the supply will have to be postponed until the newly-created body has had time to become acquainted with its duties. It will tax all the powers of the new authority to work the old machine, and for some time there will be no possibility of carrying out any new arrangement of magnitude or importance. To supersede the Water Companies is to postpone for several years any essential improvement in the mode or character of the supply. Judging by the experience of provincial towns, we should say that the interval between the transfer of the water supply and the period when the new authority will have mastered its duties, will suffice to allay the early zeal for radical changes, and the subject will be found to settle down into the quietude of contented officialism. The storm having raged, the calm will follow, and there being no longer any Water Companies to attack, the Metropolitan Authorities will form the idea that all is well. All this, however, is on the assumption that the London Water Companies are really extinguished—an issue which it is quite possible may undergo postponement to a date even remoter than that of the municipal reform which is always looming over London.

Our relation to the Water Companies of the Metropolis perfectly admits of our saying that if any improvement in the water supply of London is practicable, it ought to be carried out. We are quite prepared—just as we believe the Companies are prepared—to face the issue of the question, What can be done to improve or cheapen the water supply of the Metropolis? Let those gentlemen who talk about superseding the Water Companies, and trusting everything to a public authority, first of all ask themselves whether there is any proof that the Water Companies are utterly and hopelessly unable or unwilling to effect any necessary and practicable improvements? There seems to be a foregone conclusion in certain quarters that the Companies must be got rid of, somehow or anyhow. It is on this point that attention is primarily fixed, and everything else is expected to follow as a matter of course. At least, such is the case with many who discuss this subject, though we are glad to find that the Home Secretary and the President of the Local Government Board understand the matter well enough to avoid any such extravagances. Mr. Cross went no farther than to say that the Local Authorities might be very well entrusted with the supply, and at the same time he thought that it was most unfair to make sweeping charges against the Water Companies in general. He even wished rather to free some of the Companies from the serious charge that they had neglected the public interest for their own private advantage. The Home Secretary by no means pledged himself to a scheme for getting rid of the Water Companies. Thus he observed: "How far the best course will be to "buy up the interests of the Companies is a matter for "future discussion." The tenor of Mr. Cross's speech was reasonable and fair, while it is not too much to say that the remarks of Mr. Sclater-Booth contained very strong testimony in favour of the Companies. That Mr. Cross contemplated the possibility of consolidating the water supply in the hands of a public authority, was certainly apparent; but the Home Secretary was careful to leave himself free. As to the terms of such a transfer, Mr. Cross very wisely interposed a check against Stock Exchange speculation, by signifying that the bargain for the purchase of the Water Companies—if it took place at all—would be struck on the basis of a *status quo*, the date of which was past, the period intimated being that of the last day of the last half year.

Mr. Cross, we feel assured, will yield nothing to popular clamour, and will lay his hand to no scheme which does not promise real good to the public. He will not supersede the Water Companies for the mere sake of gratifying certain theorists, and if he thinks fit to supersede them, we trust it will be on fair and equitable terms. The argument that the Companies should give place to a public authority is not based on any charge of wilful mismanagement or corruption. It is rather assumed that a private Company cannot do that which a public authority could accomplish. Whether such an idea is correct, is one of the points on which Mr. Cross will have to satisfy himself. At present, we venture to say the Local Authorities prevent the Water Companies from doing what they would to improve the mode of supply, both for domestic purposes and the extinction of fires. Something must be done to take off the drag which is laid on at Spring Gardens and elsewhere, if the Water Companies are to make more rapid progress in the extension of the constant service, and if the use of hydrants is to become general. It might be well if the Water Companies themselves were to lay before Mr. Cross a scheme for the improvement of the water supply. On the other hand, we trust that Mr. Cross, having satisfied himself as to the nature of the improvements required, will feel it consonant with his position to confer with the Water Companies, so as to discover how far they are prepared to do the work which has to be done. A partial, if not a complete consolidation of the Companies is a perfectly practicable thing, and would effect some degree of economy, but it by no means follows that a transfer of their powers to a public body would be any gain to the community. In respect to the matter of cost, people will have to pay for the water, let the supply be in the hands of whom it will, and we should like to know on what basis a Public Authority is to levy its charge. One thing is certain, that under the *régime* of a Public Authority the scale of charge will be a rigid thing, devoid of that elasticity which enables the Companies to modify their demand upon particular classes of property. Thus, the New River Company treat the City as a special case, and, on the average, charge on one-third only of the annual value.

Inquiry into the circumstances of the London water supply will do the Companies no harm. Already we see the controversy passing into a more reasonable phase. Mr. Cross will, of course, have to entrust the collection of facts to parties in whom he has confidence, and their report will serve to guide his subsequent proceedings. The strong common sense of the Home Secretary will save him from being led astray by a mere enthusiastic dream, or by a partial statement of the case. He will desire to know the whole truth, and we feel assured that the more Mr. Cross extends his information on this subject, the more reason will he find to adopt a policy of moderation. Statements are made in opposition to the Water Companies which are discovered upon investigation to be founded in error, though accepted at first as literally true. Mr. Fawcett complained that in the district of the New River Company there were only 15,000 houses enjoying the advantage of a constant supply. This is just the half-truth which, although honestly stated, is often seriously misleading. Turning to an official witness—namely, Colonel Bolton—we find this gentleman saying, in his last monthly report, with reference to the New River Company, "This Company are "quite prepared to give constant supply when called upon to "do so by the Public Authorities, and are already giving con-"stant supply to over 15,000 houses in that district." Thus, it would appear that it is not the Company, but the Public Authorities who are to be blamed for the comparatively slow progress made in the extension of the constant service. Yet Parliament is told to distrust the Company, and to hand over everything to a Public Authority. In the report of the Local Government Board for the past year, just issued, reference is made to Colonel Bolton's report to the department, in the following terms:—"It will be seen from this report that the "certified expenditure of the Companies on works and im-"provements during the year has amounted to £168,741, and "that considerable advance has been made in extending the "constant supply to the Metropolis; nearly one-fourth of the "total number of houses supplied being now on constant "service, and the number of houses to which a constant "supply has been extended for the first time during the "last twelve months being 20,768." With proper co-operation on the part of the Local Authorities, this process would be still more rapid, and if any of the Companies are inert, it is in the power of the Authorities to exercise compulsion. Although some mistaken assertions were made in reference to the Water Companies in the recent debate, we are glad to find Parliament approaching the subject in a better spirit than heretofore, and with a somewhat

clearer light. The attitude of the Government is fair and reasonable. Investigation is to be made, and if any plan of improvement can be devised, it will be taken up by the Government and laid before Parliament. Nobody can object to this, and we are disposed to await the issue with confidence, especially as we look to the Water Companies to adopt a broad and public-spirited policy, not opposing the Government, but rather seeking to assist the Home Secretary in meeting the wishes of Parliament. We believe it will be found that, in order to benefit the consumer, the Companies stand in need of help rather than coercion; and if Mr. Cross perceives this, we may be sure that he will execute justice as between the Authorities and the Companies.

Correspondence.

[*We do not hold ourselves responsible for the opinions expressed by Correspondents.*]

THE REIGATE GAS COMPANY'S MEETING.

SIR,—The report of the Reigate Gas Company's meeting, in your issue of the 5th inst., omits the main point of the objection I raised, which was not, as you have it, that there was a Managing Director, but that the Managing Director takes his salary, or whatever else he may like to call it, out of the funds of the Company, and no entry of such payment being made to the said Director appears in the balance-sheet. It is upon this question that I threaten the Company with Chancery proceedings, unless they make a speedy alteration.

JOSEPH STEELE.

Whitgift House, Croydon, Aug. 11, 1879.

THE PROPOSED APPLICATION OF GAS PROFITS AT BELFAST.

SIR,—Referring to the observations in the last number of your JOURNAL respecting my proposition of allocating a portion of the gas profits to pay the interest of borrowed money for sanitary purposes in Belfast, you quite mistake my meaning. All owners of property are compelled to pave, flag, sewer, and otherwise complete the street in which their houses are erected; but the arterial or main sewers are a town matter, the cost of which is spread over the inhabitants generally. These sewers at present discharge into the harbour, causing an awful stench, and quite sufficient to spread disease. The cure is, and the only cure, to carry some three or four miles to sea a main drain, discharging the sewage of the town into deep water. This will doubtless cost a large sum, but is an imperial necessity, so to speak, and it was the projected cost of this that was referred to in my speech on the 1st inst. I should not for one moment dream of the application of profits to the case you refer to; but we are at liberty, in accordance with our Act of Parliament, to apply surplus profits to *public purposes*, and hence the suggestion was thrown out as an appropriate and proper application.

I read your paper with much pleasure and profit, and thank you for your kind expressions regarding myself personally.

JOHN SAVAGE.

Belfast, Aug. 14, 1879.

THE EFFECT OF FROST ON GAS APPARATUS.

SIR,—Mr. Baillie's letter on this subject, in the last number of the JOURNAL, is very opportune, and the means suggested to prevent the water of gasholder-tanks from freezing, now made through your columns, will allow of the apparatus being fitted up and kept going for some time before being actually required.

Mr. Baillie explains, in his letter, an arrangement very similar to one which, during last winter, I concluded would be an advantage to have erected ere another winter season came round. It was to have a boiler to contain about 1000 gallons, built with the top of it a little under the level of the surface of the water in the tank, and to be fed from the tank by a 4-inch pipe, and fitted with a 4-inch outlet-tube from the top; the outlet-tube to pass round the tank of a 160-feet holder, under the surface of the water, and gradually deepening toward the discharge end; the discharge end to be fitted with a full-way cock or valve.

The highest point of the outlet-pipe from the boiler to be close to one of the columns, and attached to the column a 4-inch branch-pipe to be led up from the circulating tube to a point a little above the level at which the lute of the telescopic holder will be when full of gas—say a little over 30 feet high—and placed so as to discharge against the side plates of the upper lift, near to the lute.

The boiler, when fired regularly, will act as an ordinary circulating boiler, and will raise the temperature of the volume of water in the tank, but more particularly the water round the holder in the immediate vicinity of the circulating 4-inch tube.

By the raising of the temperature of the water of the tank, the quality of the gas will be kept more regular throughout the winter months by the gas in the holder being kept a few degrees of temperature higher than the atmosphere outside, the hydrocarbon vapours being thus largely prevented from being thrown down by frost, to lie as a liquid on the water until the heat of summer again causes them to assume the gaseous form.

By connecting through the bottom of the boiler a pipe from the water-mains in the street, and fitted with a valve, by shutting the cock mentioned at the end of the circulating tube of the tank and the valve of the 4-inch inlet, and by opening the high-pressure water-valve, the boiling water in the boiler will be sent up to discharge into the lute.

It is important that a supply for the lute be taken into consideration in erecting apparatus, so as to be discharged into it at any level at which it may chance to be. The volume of water forming the seal of the lute of telescopic holders is very thin, being only a few inches in diameter and in depth, and in severe winters it is very apt to become solid ice during the night.

WILLIAM KEY.

Gas-Works, Tradeston, Glasgow, Aug. 13, 1879.

Parliamentary Intelligence.

HOUSE OF LORDS.

MONDAY, AUG. 11.

The following Bills received the Royal Assent by Commission:—Blackpool Extension and Improvement, Derby Improvement, Knutsford Light and Water, Leicester Corporation, Liverpool Lighting, Nottingham Corporation, Over Darwen Corporation.

METROPOLITAN BOARD OF WORKS (WATER EXPENSES) BILL,—brought from the Commons, and read the first time.

TUESDAY, AUG. 12.

METROPOLITAN BOARD OF WORKS (WATER EXPENSES) BILL.

On the motion of the Duke of RICHMOND and GORDON that the House dispense with going into Committee on this Bill,

Earl REDESDALE objected to suspending the Standing Orders, because, if they adopted such a proceeding, Bills would be passed, of the nature of which they were ignorant. He was afraid this Bill was not so guarded in its language as it should be, and therefore he had an amendment to propose; but as it was merely to the preamble, it might be made on the third reading. It was a very serious thing that Bills of this character should be brought in, and the language of them should be particularly and carefully guarded.

The Duke of RICHMOND and GORDON said that the Bill, on the face of it, applied only to circumstances that were past, and could not be considered as in any way affecting circumstances that were in operation. He did not wish to refer to the undertaking given in the other House by the Chairman of the Metropolitan Board of Works. His word would no doubt be taken by anybody as meaning exactly what he had said, but then he might not always be Chairman of the Board. The second clause of the Bill, however, said that the Metropolitan Board of Works might defray, out of the rates, the expenses which had been incurred by their order in promoting these Bills. Then the accounts were set out in a schedule, and therefore it would apply only to these particular accounts, and could not apply to any others whatever. He hoped, therefore, that the noble Earl would not consider it necessary to move any amendment to the Bill.

The Bill was then read a second time.

WEDNESDAY, AUG. 13.

METROPOLITAN BOARD OF WORKS (WATER EXPENSES) BILL,—reported without amendment.

THURSDAY, AUG. 14.

METROPOLITAN BOARD OF WORKS (WATER EXPENSES) BILL,—read the third time, and passed.

FRIDAY, AUG. 15.

The METROPOLITAN BOARD OF WORKS (WATER EXPENSES) BILL received the Royal Assent by Commission.

HOUSE OF COMMONS.

WEDNESDAY, AUG. 13.

THE WATER SUPPLY OF THE METROPOLIS.

Mr. FAWCETT, who had on Tuesday formally moved—"That, in view the fact that the Metropolitan Board of Works has been unable to pass any measure dealing with the Water Supply of London, this House is of opinion that it is a subject which ought, without further delay, to be dealt with by the Government"—said: I desire, at the outset, to express my sincere obligations to the Government for giving me the opportunity of bringing on this important subject; and, in expressing my own obligations, I express the obligations of the people of London generally. It is a hopeful sign of the course that the Government may pursue in the course of this discussion, and a proof that they recognize the importance of the question. I did everything that a private member could do, since the first day of the session, to bring this question forward; but I have been so unfortunate in the ballot that, without the assistance of the Government, I could not have brought it forward at all. In discussing this question, we have to consider, first, whether the quality of the water supplied is good; secondly, the effect on the material condition of the community, because without pure water it is hopeless to expect temperance; thirdly, the security to life and property of a great city dependent upon the supply being adequate; and, fourthly, whether it is supplied at the lowest possible cost. Practically, we have to determine whether the quality of the water is sufficiently good, whether the mode of supply is good, and whether the cost to the consumers is a reasonable cost. Then we shall have to consider how the quality and how the mode of supply can be improved; and if it be shown that the price charged is extravagant, we shall have to consider how it may be reduced. I think it may be said that, if there is one right which the people of a great community can claim more indisputably than another, it is that they should have a supply of pure water furnished to them at the lowest possible cost. Now, I mean particularly to impress on the House that we have not only to consider the quality of the water, but what is perhaps more important—the mode of supply; and I believe I shall be able conclusively to show that London is at the present moment suffering far more from the defects in the mode of supply than from the defects in the quality, because it is obvious that the very best water that ever was obtained from the purest spring may be polluted and hopelessly spoiled if it is so stored before it is drunk as to be liable to be mixed with all kinds of filth, and filled with all sorts of obnoxious insects. Keeping as distinctly in view as possible the questions of the quality of the water and the mode of its supply, I will in the first place direct the attention of the House to the quality of the supply to London at the present time. It is perhaps well known that we obtain our water supply in London from eight Companies. Five of these—namely, the Southwark and Vauxhall, the Chelsea, the Lambeth, the Grand Junction, and the West Middlesex—draw their water from the Thames; the East London from the Lea, the New River from some deep springs at Amwell, and the Kent Company entirely from some deep wells in the chalk. Therefore we at once see that six of the Water Companies derive their supply entirely from river sources. The Thames, in fact, supplies about 51 per cent. of the entire water used in London. In speaking of the quality of the water, I am very anxious to avoid all exaggeration. I know how easy it is to exaggerate this part of the case. Statistics may be quoted as to the death-rate among certain classes, and then an argument is raised on the fallacious assumption that the whole of this death-rate is due to one cause—namely, impure water. But, of course, it is perfectly obvious that other causes affecting the death-rate may be in operation. With regard to the quality of the water drawn from the Thames and the Lea, there are two extreme and directly opposite opinions, expressing the views of two opposite parties. There are those who say that the river water passing as it does through many large towns, and in its course draining so many acres of cultivated land, no amount of filtration can make it fit for human use. They say that however much the organic matter may be oxidized by the flow of the water, yet the water cannot be

purified. This is the opinion which was arrived at by the Rivers Pollution Commission, which sat in 1868, and of which three eminent scientific men were members. But I am bound in candour to state—and I shall be careful to state the case with complete fairness—that an entirely opposite conclusion was arrived at by the Water Supply Commission of 1866, over which the Duke of Richmond presided, and also by a Select Committee of this House which sat in 1871, and to which the Metropolis Water Bill of 1871 was referred. They stated that the Thames water, if properly filtered and properly dealt with, might be suitable for domestic purposes. I do not wish to decide between these rival opinions, but I am bound in fairness to say that I think the opinion which I last referred to—namely, that the Thames water, if properly dealt with, may be made fit for use—is confirmed by a return which I have lately read, and which I think deserves the careful attention of this House. It is well known that Dr. Frankland, one of the most eminent chemists in the world, is officially employed by the Government to analyze the water of the various Water Companies. In his report for June he said that the water supplied by three of the Companies—the Southwark and Vauxhall, the Grand Junction, and the West Middlesex, each of which draw the water from the Thames—was so excessively polluted by organic matter as to be entirely unfit for dietetic purposes. That, at first sight, seems thoroughly to condemn the water of the Thames; but the water supplied in the same month by the Chelsea and the Lambeth Companies, drawing their water from exactly the same source, was of a superior quality—in fact, it was somewhat superior to the water supplied by the New River Company, which draws its supply from springs at Amwell. From this report it seems to me that two conclusions may be drawn. In the first place, that the supply by the three first-named Companies, which covers a considerable area of London, was unfit for human use; and, secondly, it appears from this report that the inferiority of the water was due not so much to the source of supply as to the water being improperly treated and imperfectly filtered, because the Chelsea and the Lambeth Companies during the same month dealt with their water so properly that it was fit for human use, and was perhaps somewhat superior to the water supplied by the Companies who drew their water from wells. I hope I have stated, without exaggeration and with fairness, the case with regard to the quality of the water, and it seems to me that with these facts before us I should not be justified in asking the House hastily to pass a resolution condemning all the existing sources of supply, so far as they come from the Thames and the Lea. I fear if this were done it might possibly happen that the cost of improving the water supply of London would be so enormously increased, that we should place insuperable obstacles in the way of any Government carrying out the necessary change; therefore I come to what I may regard as the first part of the case—that what, at the present moment, first demands attention is an improved mode of supply. When you have effected that, you may find it necessary to improve the source of supply. As regards the mode of supply, there is no difference of opinion from that to which I have referred. Every Commission and every Committee that have investigated the subject have come to the same conclusion, that the best water in the world, the purest water which ever flowed from the mountain side, would be hopelessly spoiled if it were stored in such a manner as it is stored in the houses of the poorest classes in London at the present time. If pure spring water were placed in a cistern which is close to a cesspool in some damp and dingy back yard, if that cistern were only filled once a day, and sometimes had no fresh water poured into it for 48 hours—namely, from Saturday morning to Monday morning—then the purest water stored in such a manner would become hopelessly contaminated. At present the quality of the water used affects the rich as well as the poor. If there is poisonous organic matter in the water it may find its victims among the rich as well as among the poor; but with regard to the mode of supply, that is a question which particularly affects the poor, because in large houses there are capacious cisterns, properly ventilated and properly cleansed, and if the water put into such cisterns is pure to begin with, it may remain pure until used. But any man who knows the condition of the poor in the Metropolis, knows perfectly well that in the hundreds and thousands of houses that are being erected for them, not to say in those that already exist, the means of storing water are so far defective that it is absolutely hopeless to expect that the water can be free from pollution. But I do not ask the House to accept this conclusion simply upon my own authority. I will quote the opinion of one whose opinion demands the respect of this House. The Bishop of London is well known to have been for years one of the most hard-working parochial clergymen of London, and what does he say? He says that when he was the rector of a Metropolitan parish, in almost every house throughout his parish in which the poor resided, there were no means of storing water except a butt in the area, and this, when filled, generally overflowed the basement, which became so damp as to render the house very unhealthy; and he says that, considering that those who lived at tops of the houses had to descend to the basements for every drop of water they required, such a system placed a hopeless impediment in the way of the cleanliness of the people. He went on to remark that that state of things had not one jot improved since he left his parish; for, speaking only last week, he said his successor informed him that this system of butts in the basements still continued, and that there was scarcely a single house in that large parish which had at the present time a constant supply of water. We are continually being appealed to in this House to pass legislation to promote the temperance of the people; but could there be a more idle farce than for Parliament to seek to promote the temperance of the people, when they have no water within their reach which is fit for them to drink? Let me refer for a moment to the opinion of another eminent divine—Cardinal Manning—than whom no one knows better the condition of the poor in London, and no one has more devoted his unselfish life to their good than he has. Cardinal Manning says the water supplied to the poor is absolutely unfit for them to use, and that they are in consequence driven to the public-houses, and that this is a fatal hindrance to all temperance efforts. This opinion is confirmed—and I call the attention of the House to the authority I am about to cite—by Sir Charles Reed, who says, speaking from his experience as Chairman of the London School Board, that the people are driven to the public-house because they have no water fit to drink; that he knows that the children in the schools suffer most seriously from the bad water they have to drink, and he says they only wish they could get at home as good water as they are supplied with in the playground. But this is not a question which simply affects the morals and health of the people; it is a question which also affects the safety of life and property, because it was proved conclusively before the Committee over which the present Secretary of the Treasury presided, that you cannot, in a large city like London, have a proper security against the risk of fire with an intermittent supply of water. What takes place when a fire breaks out? The turncock has to be sought, often half an hour elapses before the water can be had, the water is at low pressure, and by the time it can be made available the fire has such a hold that a large volume of water has to be poured over it, and often more damage is done by the water than by fire. Whereas if London possessed, like Manchester, Birmingham, Glasgow, and other large cities, a constant supply of water at high pressure, the fire might be speedily extinguished with little damage to property. But I am not going, in this part of the case, to content myself with simply general statements. Let me refer to some remarkable statistics bearing on the loss of property from fire in regard to Manchester. Constant supply was introduced into Manchester some years ago. Before then, 21 per cent. of the property which was attacked with fire was destroyed; with a constant supply, that proportion has been reduced to 6 per cent. Why, I would ask, seeing that almost every other large town in England has a constant supply, should London be without one? It is sometimes said that the cost of introducing a constant supply would be so great. The cost in proportion to the population would not be greater in London than it has been in Manchester, Birmingham, and other large town. Does London obtain any compensating advantages from the intermittent system? I contend that the present intermittent system is as wasteful as it is costly. It is wasteful, because I find that the amount of water used is about twice as much as that supplied to the inhabitants of towns which have a constant supply. It may be supposed, for instance, that Manchester, being a great centre of manufacturing industry, would use, in proportion to its population, more water than London; but the average consumption of water in Manchester, and other large towns having a constant supply, is much less than that of London. I do not think it is an exaggeration to say that one-half of the quantity of water supplied to London is wasted. Then comes the question, does London obtain any compensatory advantage in the way of getting its water at a lower cost than in those towns which have a constant supply? If we take the rates in London, we find that London is not supplied at a lower cost, but, on the contrary, I shall show that the system in London is as costly as it is defective, and that probably there are no populations in England who are paying such an excessive price for their water as is paid in London. What makes the matter more serious is that the price which is paid, instead of diminishing, is constantly increasing. The water-rates in London are, on the average, 1s. 2d. in the pound, and in many instances they are much higher than this. I have letters, but I do not wish to trouble the House with them, in which it is proved conclusively that the lower middle class—those who live in houses of from £25 to £30 a year—have to pay a water-rate on the rental, not on the rateable value, of no less than 1s. 6d. in the pound; and, notwithstanding this enormous charge levied on them, they have to go many hours, in some cases for 48 hours, without the water being turned on. Now, what is the case in many of the towns in which there is a constant supply? Glasgow is particularly an instructive case, for Glasgow had not only to buy up the Water Companies which supplied the city with water before, but it had to incur the expense of bringing a better supply from an entirely new source. What has been the result since the supply of the water has been under municipal management? Why, that the rates, which in Glasgow were formerly about what they are in many instances in London—1s. 7d. in the pound—are now 9d., and the ninepenny rate not only pays the entire outlay for the acquisition of the Water Companies rights and the expenses of the new supply, but it is sufficient to create a considerable sinking-fund, which in time will accumulate enough to pay off the original outlay; therefore, we come to the conclusion that Glasgow is receiving its admirable supply of water for something like one-half the cost which is thrown on the unfortunate ratepayers of London. But not only is the price that is at the present time paid in London excessive, but it is constantly increasing. In many instances the water-rate has been doubled, in some trebled. The honourable and gallant member for Oxfordshire two years ago called the attention of the House to the fact that without obtaining a single additional gallon of water in his house, or having the quality improved, his water-rate was suddenly increased from £20 to £30; and I can prove that in many instances there have been increases even in a larger proportion than that. I will direct the attention of the House to the manner in which this increase of the charges for water has been brought about. It is a narrative which is well worthy the attention of the House, and it seems to me that it supplies an unanswerable argument in favour of a change from the present system. In 1869 an Act was passed which was known as Mr. Goschen's Act for the Valuation of the Metropolis. When that Act was passed, it was never intended in the slightest degree to give the Water Companies the power of almost indefinitely increasing their charges. It was simply an Act for the re-valuation of the Metropolis for rating purposes as regards the poor. So far as the poor-rate is concerned, it makes no difference whether the amount raised is raised on a high or on a low valuation; because, if, for instance, £3,000,000 has to be raised for the poor, whether it is raised on a high or on a low assessment it comes to the same thing. But the case is entirely different with regard to the charges of the Water Companies, because if they levy their charges, as they do, on the gross rental, their charge for the water is increased by 20 or 30 per cent., and the public obtain no additional or better supply in return. This is exactly what the Water Companies have done; but this is not all. They claim to levy their charges on the gross rental, whereas all local rates and all Imperial taxation are levied upon the rateable value, which is considerably less than the gross rental. And consequently we come to this conclusion, that the charges of the Water Companies—those charges going to increase the profits of private trading companies—are assessed on an entirely different basis from that on which Imperial and local taxation is assessed. I will show the House that the Water Companies are fully alive to the pecuniary advantages which they derive from the interpretation which they have placed on this Act of 1869. I lately saw an advertisement in the papers announcing the sale of a number of shares in a Water Company. The Auctioneer, in order to parade the value of the investment, said the income of these Water Companies must increase with the increase of the population, and of the value of house property in London, and that if the increase went on as it had been going on, it would in 20 years be something over 100 per cent. Then he went on to describe another advantage in this particular Company. He said that between 1862 and 1878 the dividend on the shares had increased—the House will, perhaps, scarcely believe it—by nearly 150 per cent. This is their own statement. Well, all this additional amount has been taken from the pockets of the unfortunate people of London, and what have they received in return? The New River Company now supply a very considerable portion of London, and though their dividends have been increased by 150 per cent., what have they done to give the people a better supply? Out of the 150,000 houses which are supplied by the New River Company, not more than 15,000 enjoy the advantage of a constant supply. I think the time has come when this indefinite increase of dividends should not continue, and especially so when they are obtained at the cost of the health and convenience of the people of London. And now I think I have proved these three points—first, that the quality of the water in London is uncertain, and, in some instances, bad; secondly, that the mode of supply is radically defective; and, thirdly, that the price which is paid for this imperfect and bad mode of supply is excessive. If, therefore, the present system is to be condemned on sanitary, moral, and financial grounds, of course we are brought face to face with the question—What is the nature of the improvements which ought to be introduced and carried out? In attempting to determine this pressing question, it seems to me that too much importance cannot be attached

to the assertion of this principle, that it is not safe to allow the supply of necessaries of life to be administered simply for the purpose of increasing the profits of private trading companies. There is a fundamental and most essential difference between the supply to a great community of an article which is, and an article which is not a necessary of life. Many municipalities have thought it desirable to take the supply of gas into their own hands, so that that supply may be administered for the public advantage. But there is this most important difference, which makes the case in favour of water infinitely stronger than that of gas. If any householder in London finds that the gas which is supplied to his house is bad, all he has to do is to have the supply cut off. But with regard to water, the people of London are at the mercy of the Water Companies. Water may be reported to be unfit for dietetic purposes, but there are no means whatever of improving it. We may know that our own health suffers, we may see that the health of our children suffers, and yet we cannot go anywhere else for the supply of water, nor can we substitute anything else in its place. Therefore it seems to me that it is most important to bear in mind that the supply of water, as a necessary of life, is different from the supply of gas, which is not a necessary of life. It may be said, "Cannot you do something by more stringent legislation? Cannot you impose more stringent legislation on the Water Companies?" That is what we have been striving to do for the last 30 years. Act after Act has been passed to ensure a constant supply of good water, and what has been the result of all this legislation? Practically there is only one Company who give a constant supply to a section of London, and that is the East London Company. In their district more than one-half of the houses have a constant supply; but it is deserving of notice that with a constant supply, the pressure in that district is so extremely low, that the people often find themselves without water in their upper rooms. In the district supplied by the New River Company there are 15,000 houses; in the Kent Company's district there are 9000; in the Lambeth district, 3000; in the West Middlesex district, 2000; and in the Southwark and Vauxhall district, 450 houses which have a constant supply. In the Chelsea district there are scarcely any, and in the Grand Junction district not a single one. Therefore, we arrive at the conclusion that, after 30 years of effort, excluding the East London Company's district, considerably less than 20 per cent. of the houses of London have a constant supply. But this by no means exhausts the case, because the number of houses which have an intermittent supply is increasing, instead of diminishing; or, in other words, the extension of the constant supply does not keep pace with the growth of London. For, compare 1872 with 1877. Some 20,000 houses were served with an intermittent supply in the latter year more than the former. In face of such facts as these, it seems to me impossible to resist the conclusion that we require to go on a new tack, and to introduce a real remedy for this state of things. This is the conclusion arrived at by every Committee and every Commission who have inquired into this question. Wishing to confine my remarks as much as possible, I will simply refer to the report of one of those Committees, and I will lay particular stress upon their report, because it is the report of the last Committee which investigated the subject. I refer to the Committee known as Mr. Ritchie's Committee, over which the present Secretary to the Treasury presided. I am now going to quote the very words of the Chairman—a responsible official of the Government—as to what he thinks, and what the Committee unanimously thought ought to be done. In the report of the Committee these words occur: "Your Committee came to the conclusion that, in order to carry out such improvements as a constant supply and high pressure, it will be necessary to consolidate the superseded Water Companies under a single authority, which should administer the supply of water not so much for profit as for the public advantage." Now, as this was the unanimous conclusion of the Committee, I regard it as forming the basis for future action. Two questions at once suggest themselves for answer. In the first place, if the Companies are to be consolidated and placed under a single authority, what is the process of consolidation which ought to be adopted? Secondly, when consolidation has been effected, to what authority should the consolidation scheme be entrusted to be carried out? In speaking of the mode of consolidating the existing Companies, I wish to speak with great caution, because I know that if I attempted to force a premature declaration of opinion from the Home Secretary as to the terms on which he might buy up these Companies, his hands would be tied, and great harm might be done to the public. Therefore, I hope I shall not say a single word which will embarrass him, but I shall simply venture to throw out some considerations which may possibly strengthen his position. I suppose no one would be so unreasonable as to say that these Companies should not be fairly compensated for the property which they possess no one would be in favour of a policy of spoliation; but if the property of these Companies is required in the interest of the public, it is important on the other hand to bear in mind that an extravagant price should not be extorted from the public. In speaking on this subject, I feel I do so with a considerable amount of responsibility, for it seems to me important to define the exact nature of the property which is possessed by these Companies. It is sometimes said they possess an exclusive and permanent monopoly. I believe this is an entire mistake; they possess nothing of the kind. I have searched through almost all the Water Companies Acts, and in that search have been assisted by one of the most eminent lawyers in this House; and I believe it is absolutely impossible for the Companies to establish a claim that they have an exclusive and permanent monopoly. They have no more exclusive and permanent a monopoly than is possessed by the gas companies. In certain districts they have the right to place pipes in the streets, but over and over again this principle has been put forward with regard to the gas companies, that if it should be for the public advantage that a new company should be established in any town, then the House asserts its power of giving that right to the new company without granting a penny of compensation to the old one. In one Committee, presided over by Mr., now Lord Cardwell, and in another, I believe, by the right honourable gentleman in the chair, the doctrine was distinctly laid down that if it should be for the public advantage to introduce another means for the supply of gas, this House would simply treat the question as one of public advantage, and the new supply should be introduced without any compensation to existing companies. And this principle can be confirmed, because by the Sewers Act of 1846, and the Metropolitan Board of Works Act of 1856, the Local Authorities of the City and the Metropolitan Board have the right to sink wells wherever they like, and to supply themselves with water, without giving any compensation whatever to the existing Water Companies. Now, I wish it to be distinctly understood that I am not making these remarks with the idea of advocating that the House should sanction the creation of new companies to supply water to the Metropolis without giving compensation to the existing Companies; but I think it important to remind the Companies of the exact nature and character of their property, in order to show them that we are not helpless victims in their hands, and that if they attempt to place insuperable obstacles in the way of a great reform being carried out, and insist upon an enormous price, we have a weapon in our hands which we can use with effect. We can say to these Companies, "If you place insuperable obstacles to carrying out reform, we will carry it out in spite of you. At any rate, the people of London shall not for ever be afflicted by the evils of the present system." But I hope the Water Companies will adopt a more reasonable course; it will be to their interest to do so. It is said that in acquiring this property there will be three elements of compensation. It is said that, in the first place, the Water Companies will have to receive compensation on the gross income which they now receive; secondly, on the prospective increase of their income; and, thirdly, that they will have to be compensated for a compulsory sale. But before we compensate them on the basis of their present income, it will be of the first importance for the Home Secretary, or whoever deals with the matter, to consider most carefully whether the whole income which the Companies now receive is fairly and legitimately obtained. In speaking of the manner in which, under Mr. Goschen's Act, the Companies have increased their charges, I have reason to believe that they have no legal or equitable right to impose such increased charges as they have lately done. If that could be established, of course it would be wrong to take the money of the people of London to compensate the Water Companies for having during the last few years taken from the public a great deal more than they were justified, either by law or equity, in taking. Now I may be asked, "What are the advantages you hope to gain from consolidation?" In the first place, the Committee I have already quoted has said that without consolidation we can get no constant supply, and without a constant supply, however good the water was, it would become so bad in store, in the case of the poor, as to make it unfit for use. Secondly, there would be a great saving in many ways from consolidation. No less than £18,000 a year is paid at the present time by the various Companies in Directors fees. This part of the subject has been most carefully investigated, and those most competent to express an opinion say that the saving, under the head of management, resulting from consolidation would be no less than £100,000 a year. Thirdly, there would be the greatest possible economy with regard to the construction of new works. Any one who goes up the Thames, as I am in the habit of doing, must know perfectly well that two small works are often used to supply two contiguous districts which might be more cheaply and efficiently supplied by one larger reservoir and set of works. There would also be a great saving in pipes. I know that the Water Companies have tried industriously to frighten the ratepayers of London by saying that if their rights were acquired a great additional charge would be imposed on the rates. But I venture to assert that there is not the slightest evidence of this. All experience proves the contrary. Wherever constant supply and consolidation have been introduced, there the rates have been diminished 50, 60, 70, and in some instances 100 per cent., and the quality and supply of water have at the same time proportionately improved. It would not be necessary to raise a large loan. I do not want to go into details—I know it would be imprudent to do so—but it would be perfectly possible to create a water stock at 3½ per cent. No inconsiderable portion of the capital of the Companies is raised in debentures, bearing interest at 4 and 4½ per cent., whereas, on the security of the Metropolis, money can be raised certainly at not more than 3½ per cent. If Birmingham, Glasgow, and almost every large town in this country—if Paris, Berlin, Amsterdam, nay, even Calcutta, have a far better and cheaper supply of water than we have, why should London submit any longer to be treated worse than any other city? I now come to consider what, after all, is the most difficult part of the problem—namely, when the Companies are consolidated, what is the authority to which we should entrust the work to be done? Undoubtedly, the solution of the problem is more difficult in London than in Birmingham, Manchester, and other provincial towns, because London has, properly, no thorough municipal government. Some friends of mine have asked me to wait for the creation of a municipality. We might as well wait for the Greek Kalends; but I am not sure that if we had one great municipality the work would be done as well as by a division of labour. The work would be too large. Then I might be asked whether I want to entrust the task to the Metropolitan Board of Works. In the absence of my honourable friend the Chairman of the Board, I will not say a single word to disparage that body. But, undoubtedly, the Metropolitan Board do not at the present time, and I believe will not, until elected in a different manner, sufficiently possess the confidence of the ratepayers to have the water supply of London entrusted to them. The Board are already overworked, and it would be most unwise to throw on them this additional duty. Then, again, it is said, "Why do you not leave this matter to the Metropolitan Board, and why do you ask the Government to take it up?" A conclusive reason which shows that it is absolutely impossible that this question should be dealt with by the Metropolitan Board, or any other local authority, will be found in the procedure of this House. If a Water Bill for any provincial town is introduced, it is introduced as a private Bill, and referred to a Select Committee, and, if the Committee approve, the Bill is passed. But with regard to London, a different system of parliamentary procedure prevails. I have consulted the authorities of the House on the subject, and I find that a Water Bill for London would be treated as a public Bill, and what chance is there of an independent member forcing a public Bill of such magnitude through the House, unless he is assisted by the Government? and if the Government are willing to assist, it would be far better that they should make themselves directly responsible for what is done. Then I think we may say, after the experience of the last few weeks, that many a long year will elapse before the Metropolitan Board will have anything to do with the question of the water supply in London, for the unfortunate members of that Board were surcharged £16,000 out of their own income for the praiseworthy efforts they had made to improve our water supply. And were it not for the assistance they received from the Government, they would have been obliged to pay this surcharge. I do not want to ask the House prematurely to express itself in favour of this or that particular scheme; I do not want the House to tell the Home Secretary he must do this work in one particular way rather than another; but if I am right in throwing out a suggestion, it seems to me that when the Companies have been consulted, a public Commission might be appointed to administer this consolidated property in the interest of the public, and not for purposes of private gain. And now you may ask what is the nature of the resolution which I propose to move. I have carefully worded it, so as not to ask the House prematurely to commit itself in favour of any particular scheme. It does not condemn existing sources of supply. I have shown—and I think I have shown sufficiently—that the mode of supply in London is so bad that it must be remedied, that the quality of the water is so bad that it must be improved, and that the cost is so excessive that it must be diminished. I hope the Government will not oppose my resolution, or ask me to withdraw it. If passed, it would certainly strengthen the hands of the Government, because no doubt they will have many obstacles to surmount, and it seems to me that the hands of the right honourable gentleman would be strengthened if he could say that if he had those difficulties to encounter they must be vanquished, because the House of Commons have unanimously resolved that the existing state of things must be remedied, and the matter must be dealt with by the Government. In conclusion, I have to thank the House for the patience with which they have

listened to me. The subject is a large one, and although I fear I have trespassed too long on the time of the House, I have endeavoured to condense my remarks. I have no party motive in bringing the subject forward. If I had only thought of party, I should have been inclined to let a Liberal Government have the credit of solving this difficult problem, because I know that whatever Government does solve it will confer an inestimable boon upon the millions who live in London. But it is not a party question; it is a question which cannot wait. It is a question which concerns the health and moral well-being of the Metropolis; and, such being the case, I earnestly recommend it to the favourable consideration of the House and the Government.

Mr. SCLATER-BOOTH: I do not propose to enter into the very elaborate argument of the honourable gentleman, but I wish, as representing the department of the Government which has now for some years been entrusted with the duty and responsibility of surpervising the Water Companies, so far as statutory law allows supervision to be exercised over them, to make a few observations in reply to the able speech the House has just heard. In doing so, I will, in the first place, express my sense of the moderation and forbearance with which, on the whole, the honourable gentleman has dealt with this difficult and important subject. I do not say that I concur altogether in the statements he has made; in certain particulars, I think it will be found that some of his statements as to the excessive prices and bad quality of the water may, on examination, be discovered to be less well founded than he supposes. But, while saying that, I admit that there is a great deal in what the honourable member has brought forward, and which he has supported by a very powerful body of public opinion, which requires the attention and serious consideration of the Government. I have said that I speak on behalf of the department charged for some years with the supervision of the Water Companies. There is a good deal in the existing law to enable supervision to be exercised over the Water Companies in some respects, but not in all. Over the quality of the water, undoubtedly, there is some power of supervision, and I think also over the question of constant or intermittent supply, which I shall presently allude to; but I may here say that, if the extension of constant supply has not been so rapid as could be desired, still some progress has been made in that direction. As regards the quantity of water, we have no power of exercising supervision; neither, again, have we any power to interfere with the statutory rights of the Companies in reference to the amount that they are entitled to charge. I agree, however, with the honourable gentleman that the action of the Water Companies with regard to the Metropolis Valuation Act, 1869, has introduced a change which certainly does require the intervention and consideration of Parliament. The honourable member has dealt with the question under three heads—namely, the quality of the water, the mode of supply, and the cost. As regards the quality of the water, I rejoice extremely that he has disconnected himself altogether from what has been the foundation of the previous action of the House—namely, the assumption that a new source of supply is absolutely necessary for the satisfaction of the people of London. He has, very wisely, I think, severed himself from that view of the question. It would greatly increase the difficulties of the subject to propose to set up a new source of supply; because, as soon as we make that a postulate in dealing with the subject, one entirely gets rid of any possibility of affecting an economy in the charges to the people. Assuming for a moment that £20,000,000, or any sum that you may name, would be required to buy up the existing Water Companies, and to improve the distribution by means of economy in administration, you entirely destroy the whole of those economies if you insist that, in addition to the existing sources of supply, a new source of supply should be found from which the water should be conveyed to every house in London. Therefore, I listened with great satisfaction to the observations of the honourable gentleman on that head, and the more so because I am satisfied that the common sense of the people with regard to this question will lead them to say that the existing sources of supply are in themselves, if not so perfect and so complete as might be desired, still sources of value, and are not so very objectionable that they should at once be done away with. The honourable gentleman has quoted the reports of Dr. Frankland as to the condition of the water in June last, and he held up as a laudable example the water which was supplied by the Chelsea Company, which at that time appeared to be in a satisfactory condition; but I could point out to him occasions when the water supplied by the Chelsea Company was pronounced unfit for dietetic purposes; and I may say, with regard to the New River Company, that that has happened on many occasions. The fact is that these monthly returns can only be relied upon for what they were worth at the time, and it is evident, from the variations in the reports of Dr. Frankland, that the Water Companies could with proper care and due caution supply water sufficiently good for the use of London. I do not rely on my own opinion in saying this, nor do I say that the supply is not capable of improvement. But we must have some regard to what our predecessors have done. The Duke of Richmond's Commission, in 1866, after a most elaborate investigation, made a distinct report in favour of retaining the existing sources of supply, as being sufficient in quantity for many years to come, and capable of being supplied with due regard to quality; and we must remember that the recommendation was considered by the Committee of this House, over which Mr. Ayrton presided in 1869, of which I myself was a member, and this Committee distinctly endorsed that opinion. And when we know that from that time to the present continuous efforts have been made, under the provisions of the Thames Conservancy Act, to improve the condition of the Thames, I say that unless we take an entirely new standpoint, and insist on a new standard of quality, we must, I think, admit *primâ facie* that the existing sources of supply are quite sufficient for our purpose. I am not here, however, for a moment to deny that there is something wrong and anomalous both as regards the quality, the cost, and the mode of administration. This is obvious from the fact that five Companies draw their water from the Thames without any inter-communication or facilities for arrangements *inter se*, and one cannot doubt for a moment that there is in consequence a great deal of confusion in the mode of distributing large quantities of the water. These are points on which I entirely agree with the honourable gentleman, that something is required to be done. The House is probably aware that there is annually a notice in the Local Government Board's reports of the proceedings which have been taken during the year in regard to this particular subject matter of their administration. In the report which has been recently issued, I find some passages which I will take the liberty of reading to the House. The report states what has been done to improve the supply during the year. It says: "Considerable advance has been made in extending the constant supply to the Metropolis, nearly one-fourth of the total number of houses supplied being now on constant service, and the number of houses to which a constant supply has been extended for the first time during the last twelve months being 20,768." That, at all events, shows some progress in the direction in which we all desire to go. Then it goes on to quote a statement by Colonel Bolton, the Examiner, that, "Notwithstanding the effectual filtration and delivery of good water by the Companies to their respective districts, the supply frequently deteriorates after having been delivered by the Companies into the cisterns of the consumers;" and the Examiner points out that "the remedy for this is a constant supply, but that until a constant supply is general, the attention of all householders should be given to the fittings and cleanliness of their cisterns, as well as to their house-drains, and the water-pipes connected therewith, upon which depend, in a great measure, the purity and abundance of the domestic water supply." I may state, as a matter of fact, that the owners and occupiers are themselves, to a certain extent, answerable for the deficiencies in the present mode of supply. The owners are themselves great obstacles to the continuous supply, and there is nothing more important, in my opinion, than a consideration by what means a constant supply shall be insisted upon. Although the statements of the Bishop of London and Cardinal Manning, and others who spoke at the Exeter Hall meeting the other evening, are, no doubt, true, so far as they go, I cannot admit, on the other hand, that no advance has been made as regards the constant supply. Nor can I admit that the Water Companies really are to blame for the difficulties they encounter in furnishing a constant supply. There is already a constant supply to a great many of the most important thoroughfares and streets in London; and the question for consideration is how the constant supply, which they are ready and pledged to furnish, can be made available for the houses of the poorer classes. Then, with regard to the price. I am sure that I cannot agree with the honourable gentleman, that the price charged for water, taking London all round, is so heavy as he seems to believe; on the contrary, I have been informed, and have myself examined figures placed in my hands, which show that, taking the whole of London, the price charged to the consumers is less expensive than in Manchester and Liverpool.

Mr. FAWCETT: That is taking it at so much per gallon?

Mr. SCLATER-BOOTH: A thousand gallons in London costs something like 8d. to 9d., the cost in Glasgow is about 9d., and the cost in Liverpool and Manchester about 1s.

Mr. FAWCETT: I am sorry to interrupt the right honourable gentleman. I never said the cost per gallon was not less than in Liverpool; but I said that so much water is wasted in London that the price per gallon has nothing to do with it. My argument was that the water-rates were higher in London.

Mr. SCLATER-BOOTH: I quite agree that the waste may be a question; but the actual cost of this water in London is not nearly so heavy as has been supposed; and, assuming we were to go in for an expenditure of £5,000,000 or £10,000,000 for a new supply, we remove the question of the reduction of price to a distance which is unapproachable. I think the operation of the system under which the charges are made upon the ratepayers in London, is certainly injurious to the smaller class of houses, and that the wealthy do not pay, in proportion, so much as is required to be paid for a house of the poorer class. That is, I believe, the result which comes exceptionally from the mode in which the Water Companies now charge. But at the same time it must not be forgotten that they charge under the statutory provision, and that although they have from time to time heightened their charges according to the increase of the value of rateable property, they have not, I am told, in any one case gone to the maximum which they might have levied; and the figures before me tend to show that they are very much within that maximum, if you take London on the average. I should like also, before I leave this part of the subject, to state that I have had a return from the Registration Office, to show what the death-rate is in different quarters of the town supplied by the eight different Water Companies, and it is rather remarkable, though I do not rely upon it as being conclusive, or attributable solely to the water supply, but only mention it as showing that the water is in no case so bad as to exercise an appreciable influence upon the death-rate. I say it is rather remarkable that, taking the death-rate of London as, upon the average, 22·5 per 1000, I find the district supplied by two of the three Thames Companies—namely, the Grand Junction and the West Middlesex—have a death-rate of only 18·6 and 19·6 per 1000, whereas in the district supplied by the Kent Company, the death-rate is 21·1; and, again, in the district supplied by the New River Company, which I may say is equal in extent to the population of Liverpool and Manchester put together, the death-rate is a good deal higher than in the district supplied by the two Thames Companies to which I have referred. In the New River Company's district the death-rate is 22·7; in the East London, 24·6. There are, of course, obvious reasons why it should be higher in that quarter of the town; but if it is true that the water is so bad as many gentlemen who write in the newspapers are apt to assume, we should see in the death-rate return some more perceptible results following from the use of this supposed polluted water. I said the other day, in reply to the honourable gentleman opposite, how much had been done of late years to improve the condition of the Thames; and I am satisfied that, in the course of a few years, the Thames will be as free from pollution as it is possible for a river under its circumstances to be. Far be it from me to say it would be as satisfactory as getting water from the mountains, as Rome does; but when you come to inquire into the cost of bringing water from the mountains of Derbyshire and Wales, you have to regard the existing state of things from the point of view of common sense and economy, as well as from the more scientific requirements of what the purists in these matters would think to be desirable. In regard to the remedies which the honourable gentleman proposes, I will not enter upon that, because I do not wish to anticipate what the Home Secretary may say at the close of the debate; nor do I say it is expedient to enter into a discussion on that subject; but I would say that one of the great difficulties is that the area supplied by the Water Companies extends far beyond the area of the Metropolis. The Metropolis is really not a quarter the size of the districts the Water Companies supply, and it is extremely difficult, therefore, to combine unification of the Companies in London with any Metropolitan Authority. The rates of the Metropolis may be fixed, no doubt, on a scale equal to the capital of the united Companies; but it would not be just to charge the creation of a water stock on the rates of the Metropolis, for a district supplied which extends far beyond the Metropolis. On the other hand, there is no power to charge the rates of a district beyond the Metropolis with any rate of the kind, and the existing rates are not adequate to the creation of a water stock. The powers of the Water Companies over the districts are simply the powers to charge the consumers of water, and there is not, that I know of, under the existing laws, any means by which the rateable value of the Metropolitan portion of these districts could be rendered chargeable for the purchase of these works. I think that would have been a fatal difficulty, even if there were no other objections to the proposals made last year or the year before, by the Metropolitan Board of Works. The indication which the honourable gentleman gives of the best solution to which he saw his way is, in my judgment, a much more reasonable and practical way of looking at the subject than was proposed by my honourable and gallant friend, the Chairman of the Metropolitan Board of Works, last year. But that subject is one of great difficulty and importance, and I will not further enter upon it at this time. I will merely, in summing up what I have said before, repeat that, in my judgment, it is possible to over-exaggerate the mischief that exists in the system; because, in doing so, you raise a difficulty in the way of remedies which are comparatively easy. That the five Thames Companies

should be placed on the same system of unification, appears not only to be reasonable, but almost necessary. That the whole water supply of London should be subject to a uniform and central administration, seems to me also a most desirable thing. The economy which might be effected by reducing the separate management of the Companies would be very desirable, though I do not think the saving would amount to the sum stated by the honourable gentleman. But, even if the saving would be anything like what he has stated, you must set against that saving the immense outlay that would be required for the improvement of the means of distribution. Having said so much, and looking at what the honourable gentleman has so well brought forward, I can only say, although the authority exercised through the Government department which has this matter in charge has been carefully and judiciously exercised since the constitution of the Local Government Board, I am not at all prepared to say that their power is sufficient for the redress of all the complaints which reach them. On the other hand, I am obliged in fairness to admit that the Water Companies show an immediate desire to remedy the mischief complained of, so far as they can do so compatibly with their existing mode of conducting operations. I find the greatest readiness in them to meet any complaint or any suggestion which I have from time to time offered for their consideration, whether as regards the laying out of fresh capital in the construction of new works, or as regards the furnishing of a constant supply. The reference to new works reminds me of a point to which I think the honourable gentleman ascribed great evils, and on which, I think, there is a great deal—namely, that the Engineers of these eight different bodies do not act together, or in consultation, or under any central supervision. This causes the Companies unnecessary expense and complicated systems of working, which must act to the prejudice of the consumers, as well as be injurious to the Companies. I believe a vast sum of money might have been saved had some central control been exercised over their operations. I have kept the House long enough, for I know what it has to get through in the course of the afternoon. I only once more compliment the honourable gentleman on the moderation of his speech, and I hope he will not expect anything very specific from the Government in the nature of a reply to the arguments he has brought forward.

Mr. A. Peel: Fourteen years ago I sat on a Committee of this House, one of whose recommendations was, that the several Water Companies of London should contribute a sum of about £5000, for the purpose of having the River Thames properly looked to, in order that the water as it came to their intakes should be of a purer character than it otherwise would be. The right honourable gentleman, the President of the Local Government Board, made a remark as to the inconvenience of taking a new source of supply as a postulate in any arguments on this subject; and he complimented my honourable friend the member for Hackney, on the fact that he had dropped out of view any other source of supply, and looked on the Thames as a sufficient source for our water. I beg in this respect to differ from both the right honourable gentlemen and my honourable friend the member for Hackney, because I think it does not do to leave out of sight the possibility of getting a supply of water for London from another source than from the Thames. I do not for a moment mean to regard as practical the suggestion that has been made by Committees of this House, that we should go to Plinlimmon, or any mountain where there is a much larger rainfall than on the east coast. I regard that for the moment as a mere theory, and do not wish to go into the merits and demerits of the arguments in respect to it. But the honourable member for Hackney dwelt, I thought with very great force, on the way in which this question of the water supply affects the poorer districts of the Metropolis. He dwelt especially upon the system of an intermittent supply, which sends the water into tanks, where it remains for a longer or shorter period, and is then drunk by the inhabitants, the tanks in the poorer portions of the Metropolis being mere water-butts. We certainly had a scandal at a West-end club with respect to the state of the cistern into which the water was supplied, and if the West-end clubs are thus affected by this system, the objection applies with ten times greater force and effect to the crowded dwellings of the poor in the East of London. I looked into what is a great reservoir of information on this subject—namely, the Sixth Report of the Rivers Pollution Commission, in which, I must say, in connection with the whole question of water supply, is contained most ample stores of information, from which anybody can draw; and I there find a curious commentary upon a subject to which the honourable member for Hackney has alluded—namely, the way in which the Legislature has neglected to look after the interests of the poorer classes in this question of the water supply. The Commissioners—most able and competent men—comment upon the fact that by the Metropolis Water Act of 1852, the Legislature forbade the Water Companies, for fear of contamination, to store filtered water in open reservoirs within a distance of five miles from Charing Cross. They go on to comment on the inconsistency of the Legislature which adopted such a view as that of permitting water to be doled out by an intermittent supply into the foul cisterns of the East of London. They say, and I think rightly, that whereas 70 gallons of water to one square foot of contact with the open air was the limit which they imposed in the suburbs of London, they quite ignored, or, if they did not ignore, they sanctioned, a scheme whereby 7 gallons of water per square foot of surface should be exposed in the abodes of the poorer classes, to the immensely more vitiated atmosphere which, of course, would abound amidst these crowded dwellings. "Surely," they go on to say, "the carefulness which has forbidden, by law, the open storeage of filtered water in reservoirs for London within five miles of Charing Cross, ought, before this, to have militated against the supply in which the water is necessarily exposed gallon by gallon in small storeage reservoirs, in house after house, to far fouler and more infectious exhalations than it is possible to imagine in the open air of any London suburbs." The arguments of the honourable gentleman the member for Hackney, as to the necessity of putting the management of the water supply under one body, and that a public body, are, I think, very strong, and I should even go so far as to say they are unanswerable. He dwelt upon the enormous economical results to Glasgow of municipal management, to the purity of their water, and to the enormous saving to their rates; and in all that I venture heartily to agree with him. There are, I believe, eight Companies which deal with the water supply of London, and four of these adopt the constant supply system. I am told that to use the words "constant supply" is erroneous; for where it is said to be constant, it really rather partakes of the nature of an intermittent supply. But, however that may be, there are four Companies which are nominally supplying water constantly to parts of their system; and, if the New River Company and the Lambeth Company are able to supply, in any sense, a constant supply to such places as Shoreditch and Newington, one of the arguments against a constant supply to other portions of the Metropolis is very much weakened; for the argument against the constant supply is that there will be a great danger of waste, necessitating careful supervision of an expensive character. However, if this constant supply system be adopted in Newington and Shoreditch, it might be adopted in the richer portions of the Metropolis. The honourable gentleman the Home Secretary, who will, I understand, give us his views on this subject to-day, may perhaps tell us what has been done for the purification of the Thames with the amount contributed by the Water Companies. I should like to know in what way that large sum of money, £5000, is expended for procuring the purification of the river before it is taken into the supply. Before the Committee of 1865 it was stated that they would not be justified in offering £5000 per annum if it were not that the Bill contained an express provision for the purification of the river. But what steps have been taken for purifying the river in the sense meant by the Water Companies when they gave this large contribution for that purpose? The necessity of having some public body was confessed both by the Commission of 1869 and the Committee of the Metropolitan Fire Brigade, which reported in 1877. Both of these Committees reported in favour of some public and responsible body, and pointed out the advantages of having a public body, some of which would be uniformity of action in cleansing the source of supply, and also in enforcing a constant supply to the inhabitants. Now, the number of conflicting authorities that are going over the same ground, and clashing with one another, and dealing with this question, is well known to the House. There is the Metropolitan Board of Works, who, it appears, burned their fingers in dealing with this subject in respect of their two Bills in 1878. There is the Thames Conservancy Board, a body whose report for the year 1878 has just been laid before the House. With the permission of the House, I should just like to read some of the conclusions they have come to, or, rather, a *résumé* of the works they have effected in 1878. In reference to the River Thames, from which we take our supply, they say that various samples of water, from the mills and other places, have been analyzed, and where it has been found to be injurious, notices have been served upon the authorities and other persons as the first step towards ulterior proceedings, should illegal pollution be continued. The sewerage works of Oxford are still incomplete, notwithstanding the pressure put upon the local authorities by the Local Government Board and the Conservators. When these works have been accomplished, the works for diverting the sewage from the Thames above the intakes of the Water Companies will be complete. I think that is a most sanguine statement on the part of the Conservators. We are led to believe that when the sewerage works of Oxford are complete, we shall have no sewage flowing into the Thames above the source of supply. If that were true, that would be a considerable argument in favour of the present supply. But I do not agree with them in thinking that they have examined all the sources from which contamination may come throughout the whole course of the stream. And even if they had done so—supposing they had done all the work to be done in reference to places like Windsor and Oxford, which have been notorious for throwing solid sewage matter into the stream—there is no account taken of the vast area of land from which, in times of flood, immense masses of the most offensive and foul manures are swept into the river. Within the last three years the necessity for taking in hand the question of dealing with these floods has been several times before us; but these floods are repeated with a growing intensity. The quantity of foul water thrown into the Thames is incalculable, and is but slightly appreciated in the reports of the Conservators. I heartily agree with my honourable friend the member for Hackney in insisting that the supply of such a necessary of life as water should be maintained by a public body; and that that public body should not be subject to the caprice of commercial considerations, or to the requirements of shareholders, and to the necessary fluctuations of policy to which such requirements would lead. I would earnestly express the hope that the Government will accept the motion made by the honourable gentleman. The Government will observe that there is nothing whatever stated in the motion which they might not fairly accept. Objections have been taken on the question of cost, but there is no reference to cost in the motion. It only says that it is time that a measure dealing with the water supply of London should be introduced, and on that conclusion I most heartily agree, and think the honourable gentleman, in bringing forward the subject at this late period of the session, has done great public service.

Mr. Cross: No one could have heard the speech of the honourable member for Hackney without feeling grateful to him for having brought the subject forward, and having brought it forward in a speech of great moderation, and with an evidently earnest desire to carry out his object, whether he carries this motion or whether he does not. I wish to say that this is a question which has been brought under my notice for some time past. It has had a certain amount of consideration already, and I hope that it will have even more. I have received a great number of deputations from influential persons of all classes in the Metropolis, and no one can inquire into the subject as it has been my duty to do, without seeing that it is a question which practically cannot be set aside without the most stringent inquiry as to whether any measures can be adopted, and, if so, what. The matter has been prominently brought before my notice that I should have been guilty of a great dereliction of duty if I had not considered the whole subject very carefully. The honourable member for Hackney has brought forward three special points which he has pressed on the attention of the House—first, the quality of the water itself; secondly, the mode of supply; and, lastly, the cost of the supply; and he asks very fairly, cannot you improve the quality of the water, cannot you secure a much greater efficiency in the mode of supply, and cannot you manage somehow or other to do this, at all events at less cost to those who have to consume the water. First of all, as to the quality of the water itself, the honourable gentleman has said fairly that, so far as the quality is concerned, there has been a great deal of exaggeration on the point. Whatever view is taken as to what has been done—and I quite agree that a great deal has been done within the last few years—it is impossible for any one to say that the supply of water to London is such as could be wished. My honourable friend who has just sat down has entered into a very large question indeed, and a question which I will show presently will have a considerable bearing on the last points raised by my honourable friend the member for Hackney. He has gone much farther, for, besides discussing the supply of water from existing sources, he has suggested what would necessarily be an enormous scheme—namely, that of getting the water from other sources for the sake of securing greater purity, as Manchester has done not only for itself but for other large towns. That is a scheme which cannot be undertaken without incurring a very large expenditure of money.

Mr. A. Peel: May I state that my idea is that the water of the Thames might be reserved for certain purposes, and that in order to obtain pure water recourse might be had to other sources, such as deep wells in the chalk.

Mr. Cross: I am not going to enter into the details of any such scheme at present, because they involve questions which I cannot discuss to-day; but there are undoubtedly many schemes for getting water from a considerable distance. I am quite aware of the exertions which Cardinal Manning has made for the purpose of obtaining a better supply of water for the inhabitants of the Metropolis, and I wish to bear my testimony to the extreme care with which his Eminence has investigated this subject, and to the integrity of purpose with which he has sought to benefit the poorer classes. But so far as the quality of the water is concerned—that which is supplied to the actual consumers in London—there is no doubt that, putting aside for the moment the question of the sources of supply, a

vast amount of impurity is directly due to the mode in which the water is kept in the dwelling-houses. And here I may say that I think the powers of the Vestries might be exercised with much more vigour than they are at present over cisterns and tanks for the storeage of water. Passing by that for a moment, and going to the mode of supply, I am bound to say that in a great place like London there ought to be a much better supply than water from tanks. I quite agree that the Companies have already done a great deal, and no doubt would do more still, but no one will be satisfied with the present state of supply as to the mode, so long as there is not a constant supply and continual pressure; and I do not think we have a right to be satisfied. Whether we consider it as regards the actual supply to the consumers, or as regards fires, I am bound to say that the supply ought to be sufficient for all purposes. I think that the present mode of supplying water for watering the streets is one of which we ought to be ashamed. I do not wish the House to think that I would impose on the Water Companies the duty of watering the streets, or putting up hydrants, or matters not connected with the supply of water. All I insist upon is that there should be an ample supply, both for domestic purposes and for watering streets and the extinction of fires. I will not go into any comparison as to the supply given to London and the other large towns in the country. There is no doubt that they are placed under very different circumstances; nor will I assent off-hand that it by any means follows that a supply cannot be given to large towns by private trading companies, because there is no doubt that in many places water companies are supplying large towns satisfactorily. I think it most unfair to make sweeping charges against water companies generally, though I fully agree that the supply of water is a function that might be fairly placed on the local authorities. I only wish to free some of the companies, which I know have done exceedingly good work, not only in London, but elsewhere, from the charge that they have neglected their duty solely for private advantage. I quite agree, however, with my honourable friend, that the Water Companies have, without any effort on their part, reaped enormous advantages under the Metropolis Valuation Act. By that Act an apple has been thrown into their basket without the least trouble on their part of reaching it from the tree. And the worst of it is that the consumer of the water derives no advantage, not a single drop more water nor a purer quality. All the benefit of the Act, as far as I can perceive, has practically gone into the pockets of the Companies. Coming now to the practical question to which the honourable member for Hackney has referred—the question of cost. When we come to consider the question of cost, we must remember what the right honourable gentleman the President of the Local Government Board has said that there is no power of controlling the Water Companies so long as, in making their charges, they keep within their statutory powers. But I quite agree also with my right honourable friend when he says that this is a subject which in the future must be considered by Parliament, because we must look to the future as well as to the present. The question was mooted about two years ago, and I was obliged to ask in return what power I possessed if the Companies did not exceed their privileges. The honourable member for Hackney asks, can any change be made by more stringent regulations? I very much doubt whether any change for the better could be effected in that way. The Committee presided over by the Secretary to the Treasury went specially into that subject, and the recommendations they made are well worthy the consideration of the House. The honourable member for Hackney stated, when he came to that part of the subject, that he was obliged to treat it with caution. I entirely agree with him, because there is no doubt that a large amount of money is invested in these Water Companies, and anything that is said or done in this House ought to be said and done with a due regard to the effect it might have on the price of their stock. For this reason I will not at present discuss the question as to the exclusive rights of the Companies, nor as to the elements of compensation. I quite agree with him that there is a great deal to be said against the assumption that they have exclusive rights, but I think it would not be right in me to enter now into any of these particular questions. The honourable member for Hackney has practically suggested that the only course which can be taken in a matter of this kind is that the interests of the Companies should be bought and placed under some particular Board, which should have the general distribution of the water. That is a matter for future discussion; but I may venture to say that in the face of the difficulties that would have to be surmounted, it would probably not be worth while to encourage the amalgamation of Companies. I wish, however, to guard myself against its being understood that I express the definite opinion of the Government on this matter. The honourable member said that he thought a great saving might be effected by the consolidation of the Companies, and that that saving might amount to £100,000 a year, and he says that something like £18,000 a year is now expended in fees to the Directors of the Companies. I am not at all prepared to say that a great amount might not be saved; but in a question of that kind I should look to effect a saving not simply in Directors fees and management, but by a reduction of the waste of consumption. There are questions of that kind which require investigation before you are able to say how much is at your disposal for the purpose of saving. In investigating a matter of this kind, you should inquire, in the first place, what is the saving you can effect—whether, by altering the supply by joining together the mains, or something of that kind, you can effect such a reduction as to enable you to give a constant supply at considerable pressure, without an increase of the rates. The honourable member for Hackney has stated that the cost of water is very much greater in London than in other towns. I am disposed to agree with him on that point, for though I have not completely inquired into the matter, the calculations I have made all lead me to that conclusion. If, then, this is to be done, who is to do it? The House has decided that the Metropolitan Board of Works shall not undertake the water supply of London. There are very many reasons why that is an unfit body to do so. One of the reasons which my right honourable friend (Mr. Sclater-Booth) has mentioned is, that the district that is supplied with water extends far beyond the area of their jurisdiction, and that those who reside outside that area might never consent to come under their jurisdiction. That has always been to my mind a conclusive objection against putting the water supply into the hands of the Metropolitan Board of Works. As I have already said, the matter requires attention, and immediate attention. From the manner in which the public mind has been engaged with this question, especially during the last few years, it is clear that matters cannot be allowed to rest as they are. You are asked, however, to deal with a very difficult question, because, in the first place, you are dealing with an enormous population, and you cannot institute comparisons between Manchester and Liverpool, and London. On the other hand, you have to consider the vast amount of money which has been expended in the stock of these Companies, and if any notion was to get abroad that any transaction was to take place such as that shadowed forth by the honourable member for Hackney, there would be, at all events, a tendency to create a considerable disturbance in the stock of the various Companies, which would, I fear, result in great injury and disappointment. On the part of the Government, I am prepared to state this. I believe if this motion were carried that would be the result. But I am as anxious as any one can be that the whole matter should be investigated, and investigated thoroughly, and I am willing to undertake that the entire question shall be looked into in all its bearings before the House meets again—as to whether the water supply can be improved for the benefit of the inhabitants of London; whether, if that can be done, it can be done without seriously increasing the cost to the individual consumers; whether the mode of supply cannot be vastly improved; whether it is necessary for this purpose that the Water Companies—of course, it must be by agreement—should surrender their powers to some body to be appointed practically by the Government; and whether that would not be the only way in which it could be dealt with. I should not like to express an opinion on that point. All I can undertake to say is that before Parliament meets again I will take care that such an investigation shall be made as will be likely to lead to a satisfactory conclusion. Under these circumstances, I hope the honourable member for Hackney will not press his motion to a division. I do not know that I could speak more frankly than I have done. I have shown that I am perfectly alive to the importance of the subject, and to the necessity for immediate inquiry, and that there are difficulties. I am not afraid of the difficulties; they do not frighten me. Having stated that, I do not think that I am called upon to state more; but I hope the honourable member for Hackney will not tie the hands of the Government by pressing this resolution to a division, as I am sure if it is passed it will have an injurious effect on the stock of the various Companies. It might raise hopes which cannot be realized, and, on the other hand, it might be detrimental to the value of the Companies stocks. Before I sit down, there is one thing I must mention, that, if the Government do undertake anything of the kind I have stated, they will not have regard to any prospective addition to the value of the stocks of the Water Companies. We will take the stocks as we find them on a particular day—say the last day of the last half year—and no change in the action of the Water Companies, and no speculative action of the holders of the stock, will have the smallest effect on the mind of the Government in any proposal we may have to make. I want to have that thoroughly understood, because, if it is not, great mischief and injury may be the result. Therefore, all persons who may desire to deal in the stocks of the Water Companies, either by buying or selling, will understand that if the Government undertake any such scheme, they will take the stock as it stood on the 30th of June last, and on no other conditions.

Sir C. Dilke: When my honourable friend the member for Hackney asked me to second his resolution, I said that I should do so with very great pleasure, because I felt sure that I should agree with the views he brought forward from conversations I had had with him. Not only does he deserve the thanks of the House for the admirable manner in which he has treated this subject, but I cannot speak of him without referring to the words of the Home Secretary as to the thanks that are due also to Cardinal Manning and the Bishop of London. Certainly the former has taken the lead on behalf of the inhabitants of London, and I fully agree that but for what they have done this matter might not have been dealt with by Her Majesty's Government. My honourable friend (Mr. Fawcett) will not have the right of reply in consequence of the manner in which his motion was adjourned yesterday; but I think I shall be expressing his views if I say that the statement of the Home Secretary is of a satisfactory character, and one that will make it unnecessary to divide the House. Before the honourable member for Warwick advised my honourable friend not to press his resolution, I had felt there was a deal of good sense in what he said. It is wise to place a resolution on the paper, and my honourable friend has done good service in committing the House in a way it was desirable that the House should be committed. In this case the honourable member for Warwick should feel, after the speech of the Home Secretary, that it is undesirable to press this resolution to a division. I take it that there will be great satisfaction outside as to the nature of that speech. Though we may differ as to details in the nature of the body to whom this matter should be entrusted, yet in principle the Home Secretary's speech will leave but little room for difference of opinion. There was a difference of opinion between my honourable friend the member for Hackney and myself on a question that I do not intend to introduce now; because all the points have been so thoroughly thrashed out that very little can be added. All I will say is, in reference to the character of the water and of the present supply, I do not entirely go with my honourable friend on that point. The Home Secretary spoke of exaggeration in this matter. I do not know to what he was alluding. I do not think that the speakers at Exeter Hall made any statement that was not borne out by official documents on the subject. The President of the Local Government Board went far beyond my honourable friend the member for Hackney, in approbation of the present source of supply. My honourable friend did not commit himself to the statement that the present sources of supply were satisfactory. What he said was that he had so strong a case on less disputed points, that he would rely upon these, and would state the different views arrived at by those who had investigated that part of the subject. The President of the Local Government Board told the House just now that we ought to have some regard to the opinions of our predecessors, and he quoted the reports of two Committees of this House; but I must point out that since these Committees sat there has been another Committee of this House which has investigated the subject, and did not report that the supply was satisfactory. The Commission on the Pollution of Rivers most strongly and clearly reported that it was impossible to obtain pure water from the present sources of supply in the Thames. My honourable friend the member for Warwick quoted that Commission, and read a portion of the evidence. I must point out also that there are, at the present moment, monthly reports brought before us, where the Commissioners report against the present sources of supply. My honourable friend (Mr. Fawcett) seems to have taken the view that the Committee which sat in 1871 reported that the present source of supply was satisfactory.

Mr. Fawcett: The Committee of 1869.

Sir C. Dilke: There was a Committee in 1869, and there was a Committee in 1871 that was presided over by you, Sir (the Speaker), and in the report of that Committee the evils of the existing supply were pointed out, and although the Committee did not distinctly make recommendations upon the subject, still the weight of the opinion of the Committee was in favour of change, and not in favour of the existing source of supply. The President of the Local Government Board quoted the death-rate in London, in order to show that the existing sources of supply are not responsible for the high death-rate. But he has quoted figures from the district supplied by the Kent Company and the New River Company, as against that supplied by the West Middlesex Company. We must remember the Kent Company supply the most dense portions of the town, where there are other causes of disease, and that the West Middlesex Company supply better districts. Therefore, the figures are not of much value, and are not in the least worthy of the attention of this House. Moreover, as regards the Kent Company, I must point out that we have it on record by the Government Inspectors, that the existing cisterns are worse than those in any other part of London, and that that source of pollution would in itself be sufficient to account for the increased death-rate. The only reference which I will make to the defective source of supply will be drawn from the reports which are habitually communicated to this House

The reports of the present year are not published, but by the kindness of the Local Government Board I have been allowed to see the reports for the present year. It is true there is considerable variation month by month in the condition of the water in the several districts, but it cannot be said that these reports give us satisfactory testimony as to the sufficiency of water from the present source. They do show that the existing source cannot be improved into a source of supply on which such a town as this should rely. Colonel Bolton states that, while the supply generally is very good, the waters were much polluted, and extremely difficult to filter, solid matter being got rid of by subsidence before filtration. Some Companies have spent much money in storing the water sufficiently long for subsidence before filtration. Yet it is a fact that, in the present year, since these works were undertaken, the Chelsea water has been in one month the very worst, and has been charged with living organisms and fungoid growths. That being the case, I do not think that having recourse to larger areas of subsidence, and for longer periods, will make the existing source satisfactory. In spite of the great expenditure, things were worse last year than the year before, and the monthly reports of the present year show that this is worse than the last. Things have been getting steadily worse. That being so, I cannot share the views of the President of the Local Government Board, in which he says he will take steps to render innocuous the existing source of supply. I am strongly disposed to think the existing source of supply will not be satisfactory, and I do not wish this debate to close without expressing my opinion, representing as I do a district which has spent the largest sum of money in improving the existing source of supply, and has completely failed to do so. I am glad the Home Secretary tells us he is not thinking whether this thing should be done or not, but is only directing his mind as to how it should be done. He has decided on principle that it shall be done, and is only thinking of what particular scheme he shall recommend to this House. That places us in a position better than ever we have been in before, and, as I have said, the right honourable gentleman deserves our thanks.

Mr. Baillie-Cochrane: I am glad that the honourable member for Hackney has moved this resolution, because it involves the health, the welfare, the sobriety, and the decency of a great part of the population of the Metropolis; and it must be admitted the question is worth considering, when we find that there are in proportion to the number of fires three times as many deaths from fires in London as there are in any other city in the kingdom, and that this state of things arises from deficiency in the water supply. Every one will admit that the water supply in London is not adequate, and is not constant. I have not heard a single observation from any one who has addressed the House to-day, that he is satisfied with the present water supply. From the information I have from some parts of the Metropolis, I can only say that the water supply is a complete disgrace to civilization. In the East-end of London the water is stored in butts so placed as to catch the rain water. It is the fashion now to talk a great deal about the necessity of education, and we spend enormous sums in instructing the masses, but in my opinion it is much more important to provide for them the means of cleanliness and decency. In ancient times that was done. From the magnificent aqueducts not only in Italy but in the south of France, we may see that the first thing looked to in those times was an adequate supply of pure water. In all the cities of Europe there is a much better supply of water than in London. Take Manchester or Glasgow; there is a far better supply of water than in London. I believe that Manchester has spent about six millions in order to procure a good supply of water. As far as I understand, the Home Secretary does not hold out much hope of adopting one of the plans which have been suggested for obtaining a supply from the Welsh hills or from whatever source is thought most desirable; but I really think, when you consider the increase of population and the amount of the population of London, ten millions of money would be well spent in securing an adequate supply of good water for this Metropolis. Mr. Bateman, in his report, shows the importance of dealing with the matter at once, and that if it is not dealt with at once, for every 20s. which would now have to be paid to the Water Companies the inhabitants of London will have to pay them 48s. But whatever arrangement may be made, I hope we shall not be tied to the Water Companies, who have not adequately fulfilled the duties entrusted to them. I would venture to suggest to the Government that they should turn their attention to the whole question of Metropolitan improvement, and that by bringing in a measure that would remove the difficulties connected with Gas Companies and Water Companies, they would do more to immortalize their term of office than by any other course they could follow. I do trust that by next session, at any rate, something will be done that will give satisfaction to the inhabitants of London in respect to the supply of water.

Mr. Samuda: After the turn which the debate has taken, I desire to correct what appears to me would be an erroneous impression that might be created out of doors by the statement of the honourable member for Hackney with regard to the cost of water. He says that the average rate is 1s. 2d. in the pound on the rental; but the information which is given to me, and it is information on which I can rely, comes to a very different figure from that, and shows that for domestic purposes throughout the Metropolis it comes to something like 7¼d. The total rateable value of the Metropolis is £24,000,000; the total water-rate is £1,300,000; but, after all deductions are made, the net amount of the rate for domestic purposes is 7¼d. Having now dealt with that matter, let me correct a further injustice which I think that the honourable member has unintentionally done. He says that the Water Companies have availed themselves enormously of the increase which they have been able to charge their customers since the passing of Mr. Goschen's Act for the valuation of the Metropolis. Now, I have not the exact figures before me; but this I will say, that the average of the New River Company's charges are only one-third on the annual value of the charges they would be entitled to make in the City of London; but if I take the sum which they charge on the whole of their district, I find that the gross value is £10,000,000, and their gross rental for domestic purposes £270,000, being 6½d. on the gross value, or 8d. on the rateable value. That is the amount which it appears to me ought to have been given by my honourable friend when comparing the charges of the New River Company with other Companies whose charges average something like 1s. I agree with much that has been said by my honourable friend in reference to the difficulties of the case. I was very glad to hear him say, in the course of his speech, that he sees good reason why the Metropolitan Board of Works should not be entrusted with the control and management of the water supply. Last year, when the Metropolitan Board were seeking to bring in their Bill, I took upon my myself to move that it should be read a second time in six months. The view that I then took has been confirmed to-day by the President of the Local Government Board, who says that it is quite impossible to allow the Metropolitan Board of Works to deal with the case, because their district ranges over 120 miles only, while that of the Companies extends to more than that area. That brings me to a point in reference to the settlement of this question, which has been referred to both by the honourable member for Hackney and the Secretary of State for the Home Department, that there is a great difficulty, as both of them have observed, in selecting a proper authority. But it does not appear to me that this is an insuperable difficulty. I think it might be overcome by an arrangement which has been shadowed out by myself to some extent—by the appointment of a Government Commissioner or Commissioners, representing also the Companies, which could be charged with an uniform action over the entire Metropolis. I can quite understand that there would be a jealousy on the part of the ratepayers that they should not go on increasing the profits of the Companies by the additional capital which may be brought in to carry on the works. I would suggest, however, that this difficulty might, to some extent, be overcome if legislative powers were obtained by which the profits of the Companies were restricted absolutely to such stock as they possess under the existing legislative powers entrusted to them, and that by adopting the auction clauses in future Bills, or by some other means, the capital should be raised at a lower rate, so that the Metropolitan ratepayers would really possess a reversionary interest in all sums raised in future for the water supply of the Metropolis. I believe that there will have to be considerable additions made to the capital, and that a very large expenditure must be incurred in what is to be done in this direction. The honourable member spoke in support of the proposition of the Metropolitan Board of Works, which was to put down supplemental mains for the purpose of getting an additional supply of water. But it would be absolutely impossible to have separate mains—one for the supply of potable water, and the other for washing and other domestic purposes, for watering the streets and extinguishing fires. There would be a double disturbance of the streets, and, in addition to that, the inconvenience arising from the necessity of completing a portion of a district at a time; and, after all that, the additional supply would be of no use, for people would take the water from whichever tap they liked. So far as the sources of supply are concerned, it has been shown before the Commissions and Committees on the subject, that whether you take it from the Thames or the Lea, or from the deep wells, the quantity obtained is sufficient for the supply of London for a long period of time. The Thames itself is at the present moment giving 70 million gallons of water a day, and has a power of giving 350 million gallons; that is to say, if you could render available the total quantity of water which is passing over Teddington Lock in the dry season. After making every allowance, and not taking the whole of this supply, and supposing it is reduced, you still have from that source alone means of supplying the population of London for 30 years to come, even though the requirements go on increasing in the same ratio as they have done for the last 30 years. To utilize the whole of the supply that can be drawn from the Thames would, of course, involve the necessity of laying out additional capital; but I do not know that this additional capital need be a disturbing cause with regard to the water-rate, because, of course, it will have to be spread over a considerably increased population. But supposing, as has been suggested by the honourable member for Chelsea, it was deemed advisable to take the additional supply, not from the Thames, but from the Welsh lakes or any other distant source, then a considerable amount of capital would have to be laid out, and if you refer to the best authority—Mr. Bateman—you will find that he estimates that an expenditure of £165,000 would have to be incurred for every million gallons of water a day that you bring from the lake district.

Sir C. Dilke: I did not refer to the Welsh lakes, or to Mr. Bateman.

Mr. Samuda: I said if the views of my honourable friend were to meet general acceptance—namely, that the water supply of the Thames was not satisfactory—then it would be necessary to obtain a supply from the Welsh lakes. But I do not hold the view that the water supply of the Thames will be found deficient. I know that there are different views on this subject in scientific circles, the same as there are on political matters in this House, and that there are exactly opposite views on the one side and on the other. It has been mentioned in the debate that Dr. Frankland's reports are unfavourable to the Companies. On the other hand, Dr. Tidy holds exactly opposite views. Again, as far as regards Dr. Frankland's reports, they have been considerably modified of late. Even when using, regarding contamination, words which produce a very unpleasant impression on the mind, he finishes the sentence by practically saying you may drop the whole matter. Then, again, when he is framing an indictment against the Companies with such admirable skill, what does it amount to? It amounts to this, that in the same month the supply by five Companies was admirable, and by three was objectionable. Unquestionably an important element in bringing about a better condition of the water is admitted on all hands to be that the supply should be constant; and undoubtedly the difficulty of giving a constant supply does not lie with the Companies, but with the public. The public are unwilling to incur the expense, and that will always be found a considerable difficulty. I am told the cost would be about £3 per house, and for a small house about £1; therefore I presume it might be done for something between the two. I would suggest that when we have a united board, they would say that some legislative measure is necessary in order that this constant supply should be put on at once, and in the same Act powers might be given for a small annual charge to be made, which would enable the Companies finding the capital to recoup themselves in a certain number of years—say ten or twelve. That would clear away a great deal of the difficulty. But the constant supply is by no means going on at the slow rate that the honourable member for Hackney states. Assuming that you take the supply from the distant hills of Wales, and that, according to the statement of Mr. Bateman, £165,000 must be spent for every million gallons supplied per day, and assuming that you take the quantity of water which you are now using in the Metropolis, it will cost 20 millions to bring it to London, and if that be added to the sum necessary to purchase the Water Companies, or to purchase the stock, which would be the same thing, you would have to raise a total of 40 millions of money, which, if raised at 3½ per cent., would, with the cost of management, require a rate of about 1s. 6d. in the pound, whereas the cost at the present moment, as I have shown, is only about 8d. in the pound. If it is absolutely necessary to go to these distant places to bring water, then I can see no way of dealing with the Companies, except by taking the powers out of their hands by paying them at a fair rate for that which they have expended, on the principle mentioned by the Home Secretary. If, on the other hand, the public would be served by making use of the present supply from the Thames, Lea, and chalk wells, which would enable them to get the best supply they can for the next 30 years, then I believe that by harmonious action with the Companies, and by dealing with the capital in such a way that the profits of the future capital shall go to the benefit of the ratepayers, a fair and just arrangement, and one which I think would give satisfaction to the public, would be arrived at.

Mr. Shaw-Lefevre: After the statement of the Home Secretary, I will not detain the House for more than a few minutes. I listened to that statement with much pleasure, and I must say that his speech contrasts most favourably with that of the President of the Local Government Board. The statement of the Home Secretary with regard to the shares and the financial aspect of the matter I regard as most important. I think that the announcement that the holders of shares must not expect that any account will be taken of an advance in the value of the shares since the 30th of June, will tend to facilitate the arrangements that will have to be entered into. The honourable member who spoke last appeared to me to think that the honourable member for Chelsea advocated some of the schemes for bringing water from a long distance. I did not so under-

stand the honourable member. For my part, I strongly object to any of these great schemes. I have given careful consideration to the subject at different times, and I am satisfied that it is not at all necessary to enter into any such schemes. I fully concur in the statement that there is no necessity to have recourse to either the Welsh or the English lakes, and that the Thames water is quite sufficient for all drinking purposes. The supply is ample, and, when properly filtered, the water is good. The real reform required is that which relates to the distribution. In the year 1871 I had to deal with this great question, and I then found a strong opinion that it was absolutely necessary for the interests of the poorer classes that we should have a better service. The great evil is the intermittent system of supply, water being stored in wooden butts, and in all kinds of receptacles, in which it is subject to contamination. But I am satisfied that we can never hope to have a constant service carried out unless the supply is under the control of some local authority, aided by some Commission appointed by the Government. I am quite aware there are difficulties in handing it over to the Metropolitan Board. At the same time I am not at all prepared to say that the Government might not adopt some method of dealing with this question, by the establishment of some Commission on which the Metropolitan Board and the Corporation of London should be adequately represented. I think that would be the best solution of this question at the present moment. I hope the honourable member for Hackney will not think it necessary to divide the house on his motion, after the statement which the Home Secretary has made.

Mr. RITCHIE: This is a question in which I have taken great interest, and my only reason for rising is that I wish to express, on behalf of my constituents, my thanks to my right honourable friend the Secretary of State for the Home Department for the manner in which he has taken up this question, and for the promise which he has given. We all know perfectly well that the right honourable gentleman has long taken an interest in the Water Supply of the Metropolis, and I think no one can expect that he should say more than he has said to-day. There are two phases of the question—one relating to the distribution of the water, and the other to the sources of supply. We are all agreed that, so far as the distribution is concerned, it is only by the supply being in the hands of some public body that we shall be able to do away with many evils that are at present in operation. I do not agree with the last speaker, that the present source of supply is the proper source. I do not believe that any amount of filtering of the Thames water will ever have the effect of keeping up a constant supply of pure and wholesome water.

Mr. YOUNG: When I came down to the House I expected the discussion on this question would have taken a very different tone. It is generally admitted, after the various Commissions and Committees we have had upon it, that the Thames is a fair source for the supply of water to the Metropolis. There are various other parts of the subject that might be discussed, but I will not discuss them now. I will only say that, being connected with one of the Companies, we are anxious to give a constant supply. That is a necessity for the Metropolis. It is not in our hands to give it or refuse it as we like. If the right honourable gentleman will give us compulsory power over the owners, so as to compel them to provide the fittings, we will give a constant supply in no time. The Companies are quite prepared to give it. I should not have risen on this occasion, but as the Companies are now in the hands of the Government, this is the last opportunity we shall have to state our views. I ask them seriously to consider the amount of property which they have in their hands. I have no doubt that we shall be fairly treated. It is not the habit of this House to tamper with the rights of private property. There is good policy in this, besides honesty. When these Companies were formed it was to supply a want which no one else was willing to supply. The Companies have done their duty, and all I ask is that they should be treated in a fair and liberal spirit. I know the particular Company I am interested in have done all they could to obtain a good source of supply. At first it was taken without filtration at a point near Hungerford Bridge, but now they go up to Moulsey with elaborate filtration.

Alderman M'ARTHUR: I feel it due from me, as one of the representatives of the Metropolis, that I should say that the inhabitants of London are deeply indebted to the honourable member for Hackney for the admirable manner in which he has brought forward this question, and I have no hesitation in saying that the speech of the honourable member will be received with great satisfaction by the whole of the Metropolis. I agree with the Home Secretary that there are difficulties in connection with this subject; but I believe that those difficulties may be overcome in such a manner as to secure fair play and justice to the Water Companies, and at the same time ensure a sufficient supply of pure water for the population.

Mr. FAWCETT: I think the speech of the Home Secretary is entirely satisfactory. I consider that he has pledged himself to go into the matter, and come to some decision upon it, and state next session what the Government are prepared to do. I beg to say that I am entirely satisfied, and, with the permission of the House, I will withdraw the motion.

The motion was then withdrawn.

Miscellaneous News.

EXAMINATIONS IN "GAS MANUFACTURE."

The examinations in technical subjects, which were formerly carried on by the Society of Arts, have been handed over to the City and Guilds of London Institute for the Advancement of Technical Education, and are now carried on by that body. The results of the examinations in the "Gas Manufacture" section for the present year have just been published.

The following candidates have obtained certificates. The letters H., A., and E., represent the Honours, Advanced, and Elementary grades respectively, and the figures which follow denote the class in each grade. The numbers after the names show the ages of the candidates:—

Askew, Benjamin, 30, Wedgewood Institute, E. 1.
Bell, John F., 22, Liverpool Institute, E. 1.
Blair, Thomas, 24, Finsbury, E.C., A. 1, with the prize of £7.
Haddock, William S., 22, Widnes Science Class, E. 1.
Hepworth, Reuben A., 25, Halifax Mechanics Institute, H. 1, with the prize of £10.
Holden, Henry, 17, Oldham Science School, E. 1.
Hornby, John, 21, Widnes Science School, E. 1.
Kay, George W., 26, Oldham Science School, E. 2.
Meiklejohn, Charles, 21, Houghton-le-Spring Science School, E. 2.
Meiklejohn, Neill, 19, Houghton-le-Spring Science School, E. 1, with the prize of £5.
Plant, Joseph, 35, Wolverton Science School, E. 2.

The following candidates have passed in their technological subject, but, not having gained the required successes in the examinations of the Science and Art Department, have not obtained certificates:—

Carpenter, S., Stratford.
High, William R., Science and Art Department, South Kensington.

THE GASLIGHT AND COKE COMPANY.

The Half-Yearly Ordinary General Meeting of this Company was held at the Offices, Horseferry Road, Westminster, on Friday last—the Hon. RICHARD HOWE BROWNE, the Governor, in the chair.

The SECRETARY (Mr. J. Orwell Phillips) read the advertisement convening the meeting. The corporate seal of the Company was then affixed to the register of Proprietors; the minutes of the last half-yearly meeting were read and confirmed; and the following report and accounts were taken as read:—

The accounts for the half year which ended on the 30th of June last, and are herewith submitted, show that, with slight exception, the position of the Company continues to improve.

The regularity of the Company's coal-shipping arrangements has recently been interrupted by a strike of the Durham coal miners, which, besides the pecuniary loss it entailed upon the Company—calculated at £16,000—threatened at one time to be productive of great inconvenience to the public. The differences between the miners and their employers are now, however, in a fair way of being accommodated, and the coaling business of the Company has already resumed its ordinary course.

Difficulty is still experienced in dealing with the sale of coke; but as regards other residual products, the distillation and manufacture of which at the new works at Beckton was commenced in the month of June, the experience already obtained is sufficient to lead the Directors to believe that this new branch of their undertaking will prove a remunerative one.

The Directors have before expressed an opinion with regard to the effect likely to be produced upon their undertaking by the electric light. That opinion remains unchanged, but, in the interval which has elapsed since it was communicated to the Proprietors, the subject of lighting by electricity has been investigated by a Select Committee of the House of Commons, the results of whose deliberations, having been reported to the House and made public, it is now unnecessary to refer to more fully.

Improvements in street lighting by means of gas, to which the Directors have before adverted, have been tried with completely successful results. The experiments have in all cases been conducted at the Company's expense, and it is due to no fault on the part of the Company that they have in any locality been discontinued.

In pursuance of the authority given by a special general meeting of Proprietors held on the 14th of February last, the Directors promoted a Bill in Parliament, seeking powers to apply capital to the purchase or manufacture of engines and apparatus, which they proposed to sell or let on hire, with the object of encouraging the use of gas during the day as well as by night, for cooking, warming, and other purposes. Similar powers were sought by a large provincial gas company, but being refused by the Committee of the House of Commons, to whom also this Company's Bill was referred, the Directors, after such a decision, considered it useless to proceed with their own Bill. They have found it necessary, in the course of the session, to present petitions against certain Railway, Tramway, and other Bills, the provisions of which, as introduced, were prejudicial to the Company, and modifications, rendering them unobjectionable, have been arranged.

The Directors have recently, for the first time, put in operation the auction clauses of their Act of 1876. Of £100,000 ordinary stock of the Company put up for sale, £69,500 were disposed of at the auction, for the sum of £121,865, and the remainder has been offered to the Proprietors of ordinary stock at the price of £175 for every £100 to be issued. Applications have been received for an amount of stock largely in excess of the balance remaining to be allotted. The total sum to be paid to the Company is £175,240, and the premium of £75,240 thus realized ("after deducting therefrom the expenses of and incident to the issue of the stock") will, as required by the Act, be applied "in extending or improving the works of the Company," and will "not be considered as part of the capital of the Company entitled to dividend."

In order to provide for the redemption of expiring mortgages, as well as for the continual addition to works and mains required to meet the rapidly growing demand for gas, the Directors will forthwith, and in pursuance of the resolution of the general meeting held on the 14th of February last, exercise the borrowing powers of the Company, and offer to the Proprietors additional debenture stock.

The half year's working has resulted in a profit which, after meeting all preferential claims and providing for payment of the maximum dividends allowed by Parliament on the B and H stocks, admits of a dividend at the rate of 10½ per cent. per annum to the ordinary Stockholders, which the Directors recommend be paid.

No. 1.—STATEMENT OF STOCK AND SHARE CAPITAL, *on June* 30, 1879.

Acts of Parliament relating to the raising of Capital.	Description of Capital.	Standard Dividend.	Number of Shares issued.	Nominal Amount of Shares.	Called up per Share.	Total paid up.	Arrears of Calls.	Remaining to be called up and unissued.	Total Amount authorized.
									£
The Gaslight and Coke Company's Act, 1868	A Ordinary stock	10 per cent.	..	..	..	£1,540,640	..	..	
	A Preference convertible stock, 1st issue	5 ,,	..	..	..	1,870	..	..	
	Ditto, 2nd issue	Ditto.	..	..	..	1,800	..	..	1,550,000
	A Preference convertible shares, 3rd issue	Ditto.	569	£10	£10	5,690	..	..	
The Gaslight and Coke Company's Act, 1872	Ditto, 4th issue	Ditto.	50,000	10	10	500,000	..	..	1,000,000
	Ditto, 5th issue	Ditto.	50,000	10	10	500,000	..	..	
The Victoria Docks Gas Act, 1857	A Ordinary stock	10 per cent.	..	..	..	100,000	..	..	100,000
The City of London Gas Company's Act, 1859	A ,, ,,	Ditto.	..	..	..	300,000	..	..	400,000
The Companies Act, 1862, as applied to the Western Gaslight Company, Limited	B Stock	4 per cent.	..	..	..	100,000	..	..	
The Imperial Gas Act, 1854	A Ordinary stock	10 ,,	..	..	..	600,000	..	..	600,000
The Great Central Gas Consumers Act, 1851	A ,, ,,	Ditto.	..	..	..	1,560,000	..	..	1,560,000
The Equitable Gaslight Company's Act, 1842	C Preference stock	Ditto.	..	..	..	200,000	..	..	200,000
	D ,, ,,	Ditto.	..	..	..	300,000	..	..	300,000
The Independent Gaslight and Coke Co.'s Act, 1864	E ,, ,,	Ditto.	..	..	..	165,000	..	..	
	F ,, ,,	5 per cent.	..	..	..	30,000	..	..	255,000
	G ,, ,,	7½ ,,	..	..	..	60,000	..	..	
The Imperial Gas Act, 1866	H Stock	7 ,,	..	..	..	325,000	..	..	325,000
The Imperial Gas Act, 1869	Ditto	Ditto.	..	..	..	975,000	..	..	975,000
The Gaslight and Coke Company Act, 1876	..	10 per cent.	..	..	..	..	..	1,000,000	1,000,000
						£7,265,000	..	£1,000,000	£8,265,000

No. 2.—STATEMENT OF LOAN CAPITAL.

Acts of Parliament authorizing the Loan Capital.	Total Amount authorized.	Description of Loan.	Rates per Cent. of Interest. 4 per Cent.	4½ per Cent.	4¼ per Cent.	4½ per Cent.	10 per Cent.	Total Amount borrowed.	Remaining to be borrowed.
The Gaslight and Coke Company's Act, 1868	£462,500	Debentures.	£7,000	£20,000	£110,000	£329,850	..	£1,529,200	32,300
The City of London Gas Company's Act, 1859	60,000	Debenture stock.	617,000	..	50,000	265,350	..		
The Great Central Gas Consumers Act, 1851	66,000	Bonds for capitalized profits.	..	..	..	..	£130,000		
The Victoria Docks Gas Act, 1857	25,000								
The Companies Act, 1862, as applied to the Western Gaslight Company, Limited	200,000								
The Imperial Gas Act, 1854	173,000								
The Imperial Gas Act, 1866	81,250								
The Imperial Gas Act, 1869	248,750								
The Gaslight and Coke Company's Act, 1872	250,000								
The Gaslight and Coke Company Act, 1876	1,000,000	..	..	..	..	..	..	..	1,000,000
	£2,561,500		£624,000	£20,000	£160,000	£595,200	£130,000	£1,529,200	£1,032,300

No. 3.—CAPITAL ACCOUNT.

Dr. Cr.

	Expended this Half Year.	Total Expenditure to June 30, 1879.		Receipts to Dec. 31, 1878.	Received since that date.	Total Receipts to June 30, 1879.
	£ s. d.	£ s. d.		£ s. d.	£ s. d.	£ s. d.
To Expenditure to Dec. 31, 1878	..	8,424,581 10 3	By A Ordinary stock	4,099,960 0 0		4,100,640 0 0
Expenditure during half year to June 30, 1879—viz.:			A 5 per cent. preference convertible stock	*2,080 0 0	..	1,870 0 0
Lands acquired, including law charges	38,931 11 4		A 5 per cent. preference convertible stock, 2nd issue	*2,270 0 0		1,800 0 0
Buildings and machinery in extension of works	92,724 14 2		A 5 per cent. preference shares, 3rd issue	*5,690 0 0		5,690 0 0
New and additional mains and service-pipes	25,375 12 1		A 5 per cent. preference shares, 4th issue	500,000 0 0	..	500,000 0 0
New and additional meters	1,648 17 11		A 5 per cent. preference shares, 5th issue	400,000 0 0	100,000 0 0	500,000 0 0
Expenses on issue of new capital	74 4 2		B 4 per cent. maximum stock	100,000 0 0	..	100,000 0 0
	£158,752 19 8		C 10 per cent. preference stock	200,000 0 0	..	200,000 0 0
Cr. By Sale of surplus land	16,700 17 0		D 10 „ „ „	300,000 0 0	..	300,000 0 0
		142,052 2 8	E 10 „ „ „	165,000 0 0	..	165,000 0 0
			F 5 „ „ „	30,000 0 0	..	30,000 0 0
			G 7½ „ „ „	60,000 0 0	..	60,000 0 0
			H 7 per cent. maximum stock	1,300,000 0 0	..	1,300,000 0 0
			Debentures	499,150 0 0	+32,300 0 0	466,850 0 0
			Debenture stock, 4½ per cent.	265,350 0 0	..	265,350 0 0
			„ „ 4¼ „	50,000 0 0	..	50,000 0 0
			„ „ 4 „	617,000 0 0	..	617,000 0 0
			Bonds for capitalized profits	130,000 0 0	..	130,000 0 0
		8,566,633 12 11		8,726,500 0 0	‡67,700 0 0	
To Balance of capital account		227,566 7 1				
		8,794,200 0 0				8,794,200 0 0

* £680 of these issues have been converted into ordinary stock during the half year. + Paid off. ‡ Net.

No. 4.—REVENUE ACCOUNT.

	£ s. d.	£ s. d.		£ s. d.	£ s. d.
To Manufacture of gas—			By Sale of gas—		
Coals, including dues, carriage, unloading, and trimming (see Account No. 9)	474,224 19 2		Common gas, per meter, at 3s. 6d. per 1000 cubic feet	904,063 10 0	
Salaries of Engineers and other Officers at works	8,051 15 4		Cannel gas, per meter, at 4s. 4d. per 1000 cubic feet	57,607 18 1	
Wages (carbonizing)	83,489 18 3		Public lighting and under contracts—		
Purification, including £13,967 2s. 7d. for labour	28,816 8 3		Common gas	58,625 17 5	
Repair and maintenance of works and plant, materials and labour; less received for old materials, £1820 15s. 7d.	128,134 14 9		Cannel gas	4,460 15 4	
		722,717 15 9	(See Statement No. 11)		1,024,758 0 10
Distribution of gas—			Rental of meters	..	18,116 2 0
Salaries and wages of Officers (including Rental Clerks)	18,314 13 4		Residual products—		
Repair, maintenance, and renewal of mains and service-pipes	40,315 3 11		Coke, less £23,060 8s. 1d. for labour, &c.	117,186 11 4	
Repairs and renewals of meters	13,811 12 3		Breeze, less £2012 8s. 0d. for ditto	2,652 15 10	
		72,441 9 6	Tar, less £358 11s. 4d. for ditto	39,060 12 2	
Public lamps—			Tar products	3,776 0 7	
Lighting and repairing	11,621 17 9		Ammoniacal liquor, less £345 10s. 3d. for ditto	62,924 0 0	
Experimental street lighting	1,039 19 4		Sulphate of ammonia	346 16 8	
Experimental electric lighting	415 7 8				225,946 16 7
		13,077 4 9	Rents receivable	..	2,540 0 2
Rents, rates, and taxes—			Transfer fees	..	267 12 6
Rents payable	5,146 0 7		Canteen account	..	1 4 0
Rates and taxes	32,342 18 0				
		37,488 18 7			
Management—					
Directors allowance	3,750 0 0				
Company's Auditors	250 0 0				
Salaries of Secretary, Accountant, and Clerks	6,000 10 7				
Collectors commission	11,749 4 0				
Stationery and printing	2,844 14 3				
General charges	1,805 7 9				
		26,399 16 7			
Parliamentary charges	..	800 0 0			
Law charges	..	722 7 6			
Bad debts	..	4,876 9 4			
Depreciation-fund, for works on leasehold lands	..	750 0 0			
Superannuation allowances under amalgamation schemes, and annuities	..	8,287 8 3			
Public officers—					
Gas Referees and Official Auditor	883 1 8				
Public testing-stations	115 3 0				
		1,003 4 8			
		888,564 14 11			
Balance carried to net revenue account (No. 5)	..	383,065 1 2			
		1,271,629 16 1			1,271,629 16 1

No. 5.—NET REVENUE ACCOUNT.

	£ s. d.	£ s. d.		£ s. d.	£ s. d.
To Interest on debentures, debenture stocks, and bonds, accrued to June 30, 1879	..	36,203 0 0	By Balance from last account	..	336,885 12 6
Dividend on A 5 per cent. preference shares and stock	25,234 0 0		Less dividend on ordinary capital for the half year to Dec. 31, 1878	225,597 16 0	
Dividend on B stock, at 4 per cent.	2,000 0 0		Amount carried to reserve-fund for the year 1878	10,136 3 6	
„ C „ 10 „	10,000 0 0				235,733 19 6
„ D „ 10 „	15,000 0 0				101,151 13 0
„ E „ 10 „	8,250 0 0		Revenue account (No. 4)	..	383,065 1 2
„ F „ 5 „	750 0 0				
„ G „ 7½ „	2,250 0 0				
„ H „ 7 „	45,500 0 0				
		108,984 0 0			
Interest on temporary loans	..	2,419 6 0			
Commutation of annuity payable under amalgamation scheme	..	9,400 0 0			
Balance applicable to dividend on the ordinary stock	..	327,210 8 2			
		484,216 14 2			484,216 14 2

No. 6.—RESERVE-FUND ACCOUNT.

Balance, June 30, 1879	£150,079 5 10	Balance, Dec. 31, 1878	£137,788 1 6
		Interest on amount invested	2,155 0 10
		Net revenue	10,136 3 6
	£150,079 5 10		£150,079 5 10

No. 7.—INSURANCE-FUND ACCOUNT.

Balance, June 30, 1879	£75,423 18 5	Balance, Dec. 31, 1878	£74,259 9 6
		Interest on amount invested	1,164 8 11
	£75,423 18 5		£75,423 18 5

No. 8.—DEPRECIATION-FUND ACCOUNT (FOR WORKS ON LEASEHOLD LANDS).

Balance, June 30, 1879	£12,449 11 4	Balance, Dec. 31, 1878	£11,520 16 8
		Amount brought from revenue account for the half year	750 0 0
		Interest on amount invested	178 14 8
	£12,449 11 4		£12,449 11 4

No. 9.—STATEMENT OF COALS USED, ETC.

Description of Coal.	In Store, Dec. 31, 1878.	Received during Half Year.	Carbonized during Half Year.	Used during Half Year.	In Store, June 30, 1879.
	Tons.	Tons.	Tons.	Tons.	Tons.
Common	81,457	541,936	556,293	459	66,641
Cannel	12,203	51,424	48,004	51	15,572

No. 10.—STATEMENT OF RESIDUAL PRODUCTS.

	In Store, Dec. 31, 1878.	Made during Half Year.	Used in Manufacture during Half Year.	Sold during Half Year.	In Store, June 30, 1879.
Coke—*chaldrons	96,665	695,008	183,361	509,341	98,971
Breeze—chaldrons	6,913	60,927	..	58,208	9,632
Tar—gallons	1,464,307	6,498,327	..	7,511,603	451,031
Ammoniacal liquor—butts of 108 gallons	16,336	187,842	..	188,603	15,575

* Under "Weights and Measures Act, 1878."

No. 11.—STATEMENT OF GAS MADE, SOLD, ETC.

Description of Gas.	Quantity Made (part measured).	Quantity Sold.			Quantity used on Works, &c.	Total Quantity accounted for.	Quantity not accounted for.	Number of Public Lamps.
		Public Lights and under Contracts (estimated).	Private Lights (per Meter).	Total Quantity Sold.				
	Thousands.	Thousands.	Thousands.	Thousands.	Thousands.	Thousands.	Thousands.	
Common	5,803,157	282,418	5,166,108	5,448,526	75,622	5,524,148	279,009	32,774
Cannel	310,241	16,675	265,882	282,557	1,795	284,352	25,889	2,588

GENERAL BALANCE-SHEET.

Dr.	£ s. d.		£ s. d.	Cr. £ s. d.
To Capital—		By Cash at Bankers	..	206,133 16 4
Balance at credit thereof (Account No. 3)	227,566 7 1	Amount invested—		
Net revenue—		Reduced Three per Cent. Consols	150,079 5 10	
Balance at credit thereof (Account No. 5)	327,210 8 2	Three per Cent. Consols	75,423 18 5	
Reserve-fund account—		New Three per Cent. Consols	12,449 11 4	
Balance at credit thereof (Account No. 6)	150,079 5 10			237,952 15 7
Insurance-fund account—		Stores on hand, viz.—		
Balance at credit thereof (Account No. 7)	75,423 18 5	Coals	72,492 3 5	
Depreciation-fund account—		Coke	11,558 15 0	
Balance at credit thereof (Account No. 8)	12,449 11 4	Tar and ammoniacal liquor and products	32,708 19 8	
Debenture interest for amount due to June 30, 1879	28,131 1 6	Sundry stores	136,900 7 1	
Bond interest for amount due to ditto	6,500 0 0			253,660 5 2
Preference dividends for amount due to ditto	108,984 0 0	Accounts due to the Company, viz.—		
Unclaimed dividends	5,754 18 7	Gas and meter rental—		
Sundry tradesmen and others, for amount due for coals, stores, and sundries	177,695 5 10	Quarter ending June 30, 1879	404,309 0 5	
Benevolent-fund	1,592 14 7	Arrears outstanding	28,679 5 2	
Call account	54,596 0 0			432,988 5 7
		Coke and other residual products	29,169 6 3	
		Sundry accounts	1,808 8 5	
				30,977 14 8
		Retiring allowances	..	14,271 0 0
	1,175,983 11 4			1,175,983 11 4

The GOVERNOR: Ladies and gentlemen, in rising to propose the reception and adoption of the report and statement of accounts, I am happy to be able to say that it will not be necessary for me on the present occasion to detain you for any very great length of time. The current of events in this great Company has flowed so smoothly and so uninterruptedly during the period which has elapsed since we last met here, as to render it unnecessary for me to enter into many subjects which at other meetings it has been my duty to refer to. I would first of all call your attention to the accounts which have been in your hands, and I hope that you will concur with the Directors in expressing your satisfaction at the results of our half year's working, and with the accounts that have been presented to you. In the first place, we have been enabled to maintain our dividend, as well as carry over an amount of undivided profits. When we look around us throughout the whole of England, and throughout the whole of the Continent, we cannot fail to observe the very serious depression in trade which has existed now for four years. Looking especially at the iron trade, the coal trade, and the corn trade—and to these I must now, unfortunately, add the agricultural interests of the country, which are suffering from very great depression—looking to all this, we must congratulate ourselves that we are able to come before you to-day maintaining the same dividend as we paid last half year, and, at the same time, giving you, in other respects, so very favourable an account of the proceedings of the Company. I may explain now the reason why our accounts this half year are not within a very large amount so favourable as they were in the corresponding period of 1878. We have had the greatest possible difficulty in disposing of our coke. The diminution in the sale of coke, as compared with this time last year, amounts to no less a sum than £33,000. Another bad feature in our accounts—and it is completely beyond the control of the Directors to regulate it—is the diminution in the amounts received for other products—tar, for instance. We have realized a loss upon tar to the extent of £17,000 during the half year, and this, with the other sum I have mentioned, will amount to £50,000 in the half year. In addition to this, gentlemen, I have to recall to your remembrance the strike which took place in the Durham coal-fields during the period at present under consideration. It has cost us no less a sum than £16,000. Massing the whole of these losses together, the extraordinary loss of this half year amounts to upwards of £66,000, which represents a very large dividend upon the entire stock of the Company. Those matters, gentlemen, are completely beyond our control. We were obliged during the strike, not like smaller companies, who could supply themselves from the open market, and get a cargo of coal here, and a cargo of coal there—we were obliged to have a large stock of coal on hand, because no one knew how long the strike would last. In default of our contractors supplying us, we were obliged to purchase from other parties 70,000 tons of coal, which did not turn out so good as we were in the habit of having; there was a consequent loss upon that transaction, both in the amount of gas produced by the coal and as regards the residual products derived from it. I will now say a word or two as to our new works at Beckton for manufacturing the residual products. These works are in full operation as far as the requirements of the Company go. By-and-by, when the winter comes on, they will be much more extensively employed; and the opinion of the Directors is that, as far as the speculation has gone, it is eminently successful in every possible way. We are now working very large quantities of tar and ammoniacal liquor without hearing the slightest complaint of our having caused any kind of nuisance, which some parties apprehended would arise. We have carried on the works up to the present moment without complaint from any one in the neighbourhood. We are turning out an excellent sulphate of ammonia, and a large quantity of anthracene, creosote, and so on. I hope to be able to show you by the printed accounts when we next meet, that our investment in this direction has been and will be a very profitable one indeed. I have myself lately been down at Beckton, and I was delighted with the manner in which everything was being conducted in our new works, and this is saying a great deal for operations that have been undertaken by this Company for the first time. You are all aware that a Committee of the House of Commons has during this session been inquiring into the electric light question. That Committee came to no very definite conclusion, and made a report which might be read in half a dozen different ways. However, they decided that certain powers which were asked for in some of the Bills then before Parliament should not be granted, and there at present the matter rests. The Metropolitan Board of Works appear to have adopted the electric light in their board-room at Charing Cross; but I think they will very soon get tired of it. There is not the slightest doubt in the world that the electric light contains matter which is injurious to the sight and to health. I have seen this proved myself. Since we last met, the Thames Embankment has been illuminated by the electric light, and the lighting has been more satisfactory than it was during the first experiment; it has therefore been extended by the Board of Works, I believe, for some months longer. But even in its improved condition, the electric light is not one on which you can always depend. On several occasions, even within the last three or four days, the light on the Embankment has partially gone out, and our assistance has been obliged to be called in to give the public the necessary illumination. However, the Directors have not changed their opinion as to the danger or the possibility of the electric light interfering in any way whatever with the general business of this Company. From the first time I saw the apparatus in Paris, 18 months ago, I was fully convinced that it was not an application that could be made successfully with profit as superseding gas lighting in general. You are aware that during the last half year we have demonstrated to the public a process of lighting by gas which, of course, although more expensive than the old system of lamps, is very effective as far as the light produced is concerned; in fact, it is more effective than the electric light. Any gentleman who may wish to see the light may do so at the foot of Westminster Bridge, where it is in direct contiguity with the electric light, so that he will be able to judge for himself. There is a light there that completely excels the electric light in the intensity of its illumination and in the scope of its diffusion. Queen Victoria Street, in the City, is now being lighted with improved lamps on Mr. Sugg's system. The lamps at Westminster Bridge are some of Mr. Wigham's. They are giving great satisfaction, but will be continued for only a limited period, as it is now proved that if the public like to pay for it, we can give them a better light than the electric light ever will, and at a very much reduced price. We lighted Waterloo Place as far as Regent's Circus; but, for some reason or other, we were directed by the Vestry of St. James's to remove the new lamps, and to reinstate the original lamps which are now in use all over the Metropolis. I do not know the reason why they directed us to remove them, but we had no other course to pursue than to obey their orders; consequently the improved lighting has ceased in that neighbourhood. The Secretary has read the proceedings of a special meeting, authorizing us to proceed with a Bill for various purposes. The great object of that

Bill was to enable us to do as they do in Paris and in other parts of the Continent—that is, apply our capital to providing, either for sale or for letting on hire, cooking apparatus and different articles for the other uses of gas. The Board and the Committee were quite unanimous in approving that Bill. It so happened that a Bill for the same object was laid before a Committee of the House of Commons from a provincial company, and they so completely stamped out the whole principle of such a procedure, and so entirely disapproved of it, that as we were going before the same Committee at a subsequent period, we thought it best to withdraw our Bill before going to the expense of contesting it in the House of Commons; therefore, the Bill was withdrawn. It has caused a very small expense to the Company, and we are just as we were when I last addressed you. We were compelled by our Act of Parliament to adopt our auction clauses in our last raising of capital for the Company to the amount of £100,000. That auction took place some short time ago, and I am free to confess that I think we made some little mistakes in the mode of procedure which we should not do on another occasion. We put the lots in too large amounts for many parties, and, consequently, the whole was not disposed of, and by our Act of Parliament we were instructed to offer that balance to the Proprietors at the reserved price which we put upon it at the auction—namely, 175; and I am happy to say that if we had had no auction whatever we could have raised the whole of it from our Proprietors at that rate. So great is the confidence of our constituency, that they would have taken the whole, and double the amount if we had been able to offer it. Even since the report has been sent out, accompanied by the notices that we were to raise money by debenture stock, large amounts have been applied for of the A stock by those who wish to increase their investments. I think that is a very satisfactory feature in the affairs of the Company. We shall have to raise more money by-and-by, for there are very large loans coming in to be paid off, and we take power to-day to raise the amounts by debentures. We are going to do this within a very short time, and I may say that very likely we shall require to have another raising of capital by auction or tender within the present year. We shall take into our most deliberate consideration the mode we should adopt in raising that money, and I hope we have gained a good deal of knowledge and experience as to how the stock should be raised. We are going to declare, gentlemen, the same dividend as we did in the last half year—namely, at the rate of 10½ per cent. The stock, which was lately sold by auction, will not participate in that dividend, but will participate in the accruing dividend during the current half year—that is the dividend which I hope we shall declare in February next. This was all explained at the time of the auction, and we heard no dissatisfaction expressed. Every one was made aware of the intention of the Company in that respect. Just before the close of the last meeting, I think that I alluded to the question of amalgamation. We were very confident at the moment that there would have been a large amalgamation carried out. We left this room with that impression; but I regret to say, speaking for myself and speaking for others, that that scheme completely fell through. I need not enter into particulars of it at present. It was not our action that opposed it. It was the action of one of the Companies with whom we proposed to be amalgamated. The fact is they thought they would do better—and of course they were justified in trying to do better—in the interest of their Proprietors. The only other matter I will allude to is to express the deep regret of the Court of this Company at the loss we have sustained during the past year in the death of our Chief Inspector, Mr. Johnson. He died very suddenly four months ago. I have known him as an Inspector ever since I have been connected with the Company. He was associated with the Company longer than I have been, having served it for the last 30 years. The question was mooted as to what the Directors proposed to do in consideration of his very long services, and they have determined to make a small grant to his widow from the funds of the Company, paying up his salary to a certain period; and I think the matter had better be left there. The Court have nothing further to propose; in fact, they postpone any further consideration of it for a short time; and, in the meanwhile, a very solid subscription has been raised amongst the officers and *employés* of the Company, which has realized a good sum for the widow. Gentlemen, in conclusion, I have merely to say that these accounts bear somewhat of a historical character. For the first time in the existence of the Chartered Gas Company we have reached one million pounds as our receipts upon revenue for gas-rental, for the half year under consideration. I think this is a feature that we may bear in mind in future, and I am only thankful that I have been able to announce it to you. I now beg to move —"That this meeting do agree with and confirm the report of the Directors, and the Auditors report and statement of the accounts of the Company, as transmitted."

The Deputy-Governor (Mr. E. Vaughan Richards, Q.C.) seconded the motion.

Mr. Samuel Jackson said that when the working of the last half year had been so satisfactory, the Proprietors took little interest in the proceedings. As to the policy of the Board in regard to the reserve-fund, he thought that in times of prosperity, although a large dividend could be declared, prudence was equally necessary and advisable. He was aware that coal was exceptionally cheap, but he did not think, because the raw material was so cheap, and that they had possession of it for a considerable period, that something ought not to be done towards building up the reserve-fund. The net income on the ordinary capital was something like £400,000, while the reserve-fund amounted to £100,000. Ten per cent. was a handsome dividend, and it was enough to excite jealousy among outside parties. Ten and a half per cent. was still more satisfactory; but he thought there should be an addition to the reserve-fund.

The Secretary explained that no addition could be made to the reserve-fund until the end of the year.

Mr. Jackson hoped that in the last half of the present year the question would have the attention of the Board, and he trusted to see a large addition to the fund; it was only reasonable. There had been one coal famine, and it was only right that preparation should be made for any eventuality that was certain to arise in the course of time.

Mr. Graham asked, in reference to the contract for coals, whether the contractors were liable for any of the loss arising, during the recent strike, from the purchase of inferior coal.

Mr. Baddeley said that as Shareholders they ought not only to congratulate the Court, but also the Engineers and Managers, who had the manipulation of the affairs, that there had been no fines inflicted on them during the past half year. When they knew how thoroughly they were watched by the great authorities they came in contact with, he thought that the fact he had mentioned redounded to the praise of those who had the manipulation of their works. With regard to electricity, he had said at a former meeting elsewhere that he always considered there was a field for it; but he also said that the history of gas companies had not been written, and it was especially so with regard to their own Company; because when he compared the figures of the gas-rental this half year with those of last half year, it was satisfactory to know there had been an increase of £100,000. That was an increase unexampled in the history of any gas company. The profits from residual products also were large. In looking at the statement of residual products, he thought that they had held their own with regard to the sale of coke; but as the increase of gas was so large in comparison with the previous year, the make of coke had also been necessarily large, and they had not been able to command the same price. This, doubtless, arose from the fact that there was a very large amount to dispose of, and there was the element of cheap coal to come in competition with it. Looking at the two items, they had no cause to regret that they had increased their rental on the one hand, and that a loss had been sustained in the sale of the residuals on the other. The accounts presented were so favourable that there could not be one dissentient voice in the meeting as to the success of the Campany, and he wished to congratulate the Directors on the way in which they had managed the affairs of the Company during the past half year.

Mr. Burls asked, with regard to the Bill that had been withdrawn, whether the cause of the withdrawal had reference to the proposal of the Company to undertake the inspection of gas-fittings, or to the projected supply of machinery for the consumption of gas. With regard to gas-fittings, it was his earnest hope that they would obtain power to do as they did on the Continent—namely, dispense with gas-fitters. He thought that the bad supply of gas in houses arose very largely from bad fittings. All the Company asked to do was what was done on the Continent—namely, if there was any fault to be found with the gas supply, they should have an opportunity of going into the houses and seeing where the fault lay.

Mr. George Livesey said that he believed the reason why coke was not used for domestic purposes was because, as made, it was not fitted for such purposes. It was too large to burn properly. On the Continent coke was broken by the gas companies, and in that form it found a ready sale for domestic use. The difficulty in selling broken coke here arose from its bulk being materially reduced by the breaking; that which filled 12 sacks in an unbroken state would fill only 9 sacks in a broken state. He, therefore, thought that before any considerable trade could be effected in broken coke the companies would have to give up the system of selling by measure, and sell by weight. He was glad to hear the remarks made by the Governor about the late Mr. Johnson, and that the Directors had taken up the matter, thereby rendering it unnecessary for him to make a proposal to the meeting. He was quite satisfied to leave the matter in the hands of the Directors.

Mr. A. Gurney said that no doubt an increased dividend was an acceptable thing, but the reserve-fund was of much greater importance. Before they divided 10½ per cent., he thought the reserve-fund should be increased.

Mr. H. J. Slack said, in reference to the reserve-fund, he did not see any reason for departing from the resolution of the Directors. He felt perfectly confident that it would not do any harm if the business of the Company was as efficiently managed in the future as in the past. He did not think it was a misfortune to the Company that they had not power to buy and sell different kinds of implements for the consumption of gas. It appeared to him that there would be this evil attending it—the Directors would have to choose between certain forms of apparatus. His opinion was that it would be the interest of the Company to give every possible encouragement to inventors to bring forward new modes of utilizing gas for various purposes. It was impossible to go into any of the London shops without seeing that gas was very badly used. It was not the badness of the gas, but the unfortunate implements of the gas buyer, who took an article and did not know what to do with it. He did not say that it was impossible to make bad gas; but good gas was often put to bad uses. People did not take reasonably scientific pains to secure ventilation. He asked if it might not be in the function of the Company to get up a sort of exhibition, at which the makers of all really good burners could exhibit them, and also the modes of cookery and so forth. Then he thought the inspectors of meters should have a little scientific information in order to get rid of difficulties which were almost insurmountable. He believed that in London the use of gas would be doubled—nay, trebled in a short time if the public were not so ignorant of the elements of physical science. He did not wish to propose any resolution, but he thought that some mode should be adopted of popularizing information on gas matters, in order to prevent the mistakes which were now almost universally made.

Mr. W. H. Bennett said that Mr. Livesey had expressed an opinion that if coke was broken small, in order to fit it for domestic consumption, it would necessitate the sale of the article by weight instead of by measure, since it was found that when coke was reduced in size, a chaldron would contain much more than when the coke was unbroken. He was, however, at issue with Mr. Livesey upon the necessity for sale by weight, because he knew that in Paris, and other continental places, where the coke was broken and passed through sieves of various meshes, to suit it for different consumers, a price was paid proportionate to the size to which the coke was reduced. The system had been found to work remarkably well, both as regards the inducement to purchasers and increased profits to the suppliers. He hoped that the Company would see their way to follow the example with a view to increase its domestic use, and, if so, he trusted that the plan would be attended with equally satisfactory results. He intended to have prepared some further remarks upon this question, but the accounts had come into his hands so late as to preclude his doing so.

Captain Giffard (a Director) said that during the last winter he was seriously ill, and had in his room a gas-fire, which never went out, and a better and more comfortable fire there could not be.

The Chairman, replying to the various speakers, said that in regard to the coal contracts, the question had been asked whether the contractors were liable for any of the loss to which the Company had to submit in the purchase of inferior articles; but in all contracts now-a-days there was a direct clause which protected contractors in that respect. They were not liable for any expenses which might be incurred through a strike at their works. One of the great causes of the diminished receipts for coke was, in the first instance, attributable to the extremely wet weather they had had during the last winter, spring, and, he might say, summer, which had thrown the building trade completely out of gear; and, consequently, cement makers had not been taking the usual quantities. A large quantity which they could not dispose of was thrown upon the hands of the Company, who were obliged to take the best price they could for it. Their coke agent was at present on the Continent endeavouring to establish continental connections, whereby it was hoped, and it was pretty certain they should be able to dispose of a good deal of their coke. As regarded the Bill in Parliament, the Committee gave no special reasons for their rejection of the measure; but the Directors thought that, as their Bill was going before the same Committee, it would be madness for them to proceed with it. In regard to the reserve-fund, a very large balance of undivided profits was carried over, and it was in the power of the Board to apportion any part of that to the reserve-fund at the proper time. Shortly after their amalgamation with the Imperial Company, which had resulted so favourably, the Board determined to accumulate a large reserve-fund, and they had not changed their opinion as to that. They had a very good reserve-fund now, and, by means of annual additions to it, it would amount by-and-by to a large sum of money. In regard to making public the different uses to which gas could be applied in the way of heating, cooking, and lighting, the Company had subscribed largely to the recent Exhibition at

Kilburn, for the express purpose of exemplifying the different modes in which gas could be used, and though a great number of the gentlemen before him were not present, on account of the very bad state of the weather, the Exhibition of those articles was a success; and many people who were there were greatly pleased with the different modes of employing gas, both for cooking and heating purposes. He thought he had now answered all the questions that had been put to him.

The Deputy-Governor said as he was engaged both in the Brighton and the Crystal Palace Bills, he could tell them in a few words what occurred. The Brighton Company proposed to supply cooking apparatus, but they were opposed by the Corporation of Brighton, on the ground that it was an undue competition with the trade in Brighton. The Committee unquestionably adopted that idea, and so the Directors of the Chartered Company thought it would be a mere waste of money to bring a Bill before the same Committee which had just rejected the Bill of the Brighton Company. Shortly afterwards the Crystal Palace Bill came on, and he happened to occupy the opposite position to that in which he was placed with regard to the Brighton Company. He was opposing the Bill on behalf of certain traders. The Bill went through the House of Commons without opposition, because the traders were not in time with their petition; but before the House of Lords a large number of persons interested in gas-fittings in London presented a petition, but their lordships came to exactly the opposite conclusion to that to which the House of Commons had come with regard to the Brighton Bill.

The motion for the adoption of the report was then put and carried unanimously, as was also one for the declaration of the usual dividends, and the usual compliment to the Chairman brought the proceedings to a close.

NOTTINGHAM CORPORATION GAS SUPPLY.

At the Quarterly Meeting of the Nottingham Town Council on Monday, the 11th inst.—the Mayor (Sir James Oldknow) in the chair—the accounts which are appended to the following report were submitted:—

To the Town Council.

The Gas Committee report that they have conducted the business of the gas undertaking of the Corporation, entrusted to them by the Council, for the year ending June 30, 1879. They present herewith an abstract of their receipts and expenditure up to that time. It will be seen that there is a balance on the profit and loss account of £14,957 10s. 1d. in favour of the Committee. This balance remains at the disposal of the Council, for the purposes mentioned in the 7th sub-section of the 36th section of the Nottingham Corporation Gas Act, 1874.

Your Committee recommend that, after payment of £6000, by order of the Council, made on the 7th day of July last, the balance, £8959 10s. 1d., should be carried to the credit of the reserve and sinking fund.

Your Committee are glad to be able further to reduce the price of gas 2d. per 1000 feet, being the fourth reduction since the undertaking has been in the hands of the Corporation. This reduction will make the price of gas lower than it has ever been in Nottingham.

Dated the 5th day of August, 1879. J. L. Thackeray, Chairman.

Alderman Thackeray moved that the report be received and adopted. He said he considered it was so satisfactory that it would require very few words from him in introducing it. As the gas-works had been a very profitable undertaking, he did not conceive that there could be any opposition to passing the report. Still there were one or two matters he might comment upon as showing the steady increase in the consumption of gas, but before he did so he would just allude to the capital account. They had now expended on the works £518,669, and he found, on looking to the interest on the various public loans, on debenture stock and annuities, that they were paying 5¼ per cent. There was 6¼ per cent. upon the gas annuities, but, taking the whole account, it was only 5¼ per cent., and it was just to say that, in taking over the gas-works, the Corporation had done, he thought, a very good thing, because if the purchase had been deferred, the interest upon the annuities would have gradually kept increasing. He found that 10,000 tons more coal had been carbonized than in the previous year, and upwards of 90 million cubic feet more gas made. This entailed an extra cost of £640 for coal. Should this increased demand continue, which it was sure to do, the present manufacturing power would have to be worked to its utmost capacity during the coming winter, and it would be all they could do to keep even with the consumption. The Committee had prepared for this by contracting for coals of a better quality than they had been using before, but at a higher price. That was simply so as to get more gas from the same weight of coal than they should otherwise have done. He did not anticipate there would be any loss, because he thought, and the Committee thought, that better coal was cheaper. The following winter the additional works in course of erection at Radford would be in operation. These were to be on an extensive scale, and, when completed, would be on a par with the Basford and Nottingham works, although when taken on they were in a very incomplete condition. The illuminating power of the gas had averaged 18 candles, according to the Government standard as used in London, which showed that the Corporation gave gas of greater illuminating power than was required by Act of Parliament. The price had been reduced 6d. per 1000 feet, and £23,483 added to the reserve and sinking fund, £16,000 had been handed over to the town for various purposes, £15,000 written off for plant reconstructed or become useless, £5000 of this being written off on account of the Awsworth works, which had been quite abandoned, and they were constructing entirely new plant at Giltbrook. The chemical works at Awsworth had been finished, and the Committee were led to believe that they were the most complete in the kingdom. The reduction in the price of gas to 2s. 6d. per 1000 feet would make it cheaper than ever before in Nottingham, and only in very few towns had they a lower rate. With these remarks he would simply conclude by stating that the Committee had every confidence in their Manager, Mr. Wilson. They believed he was thoroughly up to his work, and anxious at all times to keep the gas-works in the most efficient condition. He (Alderman Thackeray) thought they had in Mr. Wilson a very superior officer. Of the Sub-Engineer, Mr. Knowles, and the various superintendents, the Committee had also to report favourably, and he was sure that during the whole of the past year there had not been any hitch whatever, either in reference to the works or their servants. As regarded the Engineer (Mr. Tarbotton) and the works he was now carrying out, he was certain they would show a very favourable comparison with those of other gas-works, either in the Metropolis or any other part of the kingdom. He thought all these matters required a great amount of care and attention, because there were always new questions springing up in regard to the making of gas, &c. The Engineer was not there, or there were one or two matters of a scientific nature he would have asked him to explain; but as he could not himself enter into them, he would simply move that the annual report of the Gas Committee be received, that £6000 be carried to the credit of the gas reserve and sinking fund, and that the price of the gas be reduced 2d. per 1000 feet as recommended in the report. With regard to the reduction, he had taken care to ask Mr. Wilson what he calculated the balance would be at the end of the next year, and had been assured that if no alteration was made—and there was nothing to mark that there would be—the balance would be £25,000. Therefore, at all events, the Council would agree to this reduction.

Alderman Howitt seconded the adoption of the report.

Mr. Lindley said that he could not receive the report with the same satisfaction which Alderman Thackeray had expressed. He did not think it was one which they ought to pass in its present state. He had the report—the last published—of the Manchester gas undertaking, and it contained information not given about Nottingham. For instance, one table showed the amount of rental for gas, not only for the city of Manchester, but in the outlying parts, and not for the year in question only, but for two years; so that people were able to see whether the concern was a going one or not. There was also a statement of the amount of gas used in the daytime, as well as that used per 24 hours, so that it could be seen how much gas had been used for manufacturing and cooking purposes. Various other particulars were also given, and there was in the Manchester annual statement a report of the official chemist as to the illuminating power. He had heard complaints of the bad quality of the gas in Nottingham, and if they had this report they would be able to see how it was. The Corporation of Manchester had so managed their works that during the past 16 years they had devoted nearly £500,000 to city improvements, and during that time they had, out of £380,000, trebled the value of the concern, and only owed £400,000. Sixteen years ago the value of the Manchester concern was about £500,000—similar to their own. The profits of that year were something like what Nottingham had—£43,000, but in the revenue account they had written off £12,500 for depreciation of plant. If they compared the amount received for gas in Nottingham with the amount received in Manchester, they ought to write off £10,000 out of the £14,000 balance; as they could not arrive at the prime cost of the article they sold unless they took into account the full amount of depreciation. In Manchester, during the 16 years, they had set aside for depreciation of works £310,000; last year they paid off out of revenue £25,194. He regarded the report presented as misleading, because in the revenue account there were not any items of the kind he had mentioned, and he thought in justice to the ratepayers there ought to be £10,000 or £12,000 taken off for the depreciation-fund.

Alderman Barber: What is the price of gas in Manchester?

Mr. Lindley: It is 2s. 8d. per 1000 feet, and it is the cheapest gas in Lancashire.

Mr. Turney: 2s. 8d. all round?

Mr. Lindley said it was. If in Nottingham they went on charging the same price as now, there would be a margin for depreciation. He moved an amendment that the report be adopted, with the exception of the clause which has reference to the reduction in the price of gas.

Mr. Fraser said there were one or two little matters on the face of the accounts to which attention should be called, although but a matter of form. In the general balance-sheet there was an item, "Cash at Bankers, £31,637 0s. 11d." There was nothing to show that the Bankers paid any interest for this large sum in their possession, and which they used. With regard to the reserve-fund being made a separate account, he suggested that it would be better to have a general annual balance, and apply the annual surplus in extinguishing the annuity account.

Mr. W. Pyatt said it was unfair that a town in the position of Nottingham, as to population, &c., should be compared with Manchester. He did not see the benefit which would be derived if the statistics mentioned were given to them, and he thought the Gas Committee of the Nottingham Corporation had conducted the works admirably, and as regarded the price of gas, he should support the motion for adopting the report. The most satisfactory item in the report was the immense extra consumption of gas within the past few years.

Mr. Turney seconded the amendment. He said he considered reducing the price of the gas must be to the advantage of the few and the disadvantage of the many. The few men who had large gas bills paid them because it brought profit to them. If they put up an extra gas-stove or light, they had extra men at work; and the shopkeeper, if he placed an extra light, it was to display his goods for sale, but the man who paid £2, £3, or £4 a year for gas would find no saving. He economized for the sake of his own pocket, but the man who consumed a large quantity could increase the price of his goods to meet the extra cost. The gas undertaking ought to pay £35,000 a year, and if they put the price at 2s. 10d. per 1000 feet, he ventured to say they would have from £35,000 to £40,000 a year; and then, instead of £10,000, they would have £25,000 in reduction of the rates. He had obtained figures from the gas office, showing that if they were to earn £25,000 they could give £15,000 towards a reduction of rates, and the gas consumers would even then have the advantage of getting gas at a fair price.

Alderman Gripper said it was with very great reluctance that he opposed the report of the Committee, of which he was a member, but he was not present at the meeting of the Committee when it was decided to recommend a reduction in the price of gas, or he certainly should have opposed it. He thought it was not called for, and they had not yet sufficient in the depreciation and reserve funds. He felt, as a rule, great dislike to opposing the recommendation of any Committee, but he considered in this case the price ought not to be lowered.

Alderman Howitt said that perhaps Mr. Lindley could not have selected a better argument or a report than that he had selected in Manchester, which was an exceptional case. Manchester, in the first place, bought their works when the art of gas-making was in its infancy, and then gas was charged for in Manchester upon a different basis to what it was in Nottingham, and there were many other things that might be said about Manchester. It had been said that the proposed reduction would relieve the large consumers, and benefit persons most interested, but he would query that. The rates in the town affected the large consumer, and *pro ratâ* the artisan would be equally benefited. Whilst it was desirable that they should occasionally give money to aid the rates, it was equally desirable that the consumers of gas should know what could possibly be realized by a reduction in the price of gas. It had certainly been a favourite theory of his to reduce the price to 2s. 6d. per 1000 feet, and he had no doubt the consumers and ratepayers would be equally gratified by this reduction. He thought the town would be satisfied with gas at 2s. 6d. per 1000 feet, and there it might rest.

Mr. Pratt thought the reduction the best part of the report, and, therefore, he should support it.

Mr. Sylvester said perhaps Alderman Howitt would explain what was the difference in the basis of charge for gas between Manchester and Nottingham.

Alderman Howitt said he believed the rate was assessed differently. He never could get properly to understand it, but perhaps Mr. Wilson could tell them.

Mr. Acton said he was glad to find gentlemen like the mover and seconder of the amendment, who were largely interested as manufacturers, taking this question up, and he considered it would be a mistake for the Council to sanction the proposal of the Gas Committee. When the gas concern was taken over, it was understood that it was to be conducted on a thoroughly satisfactory business basis, due regard being had to the depreciation of plant; but, beyond that, efforts should be made to make the concern beneficial to the rates. He would call attention to one point, which had not been mentioned by the previous speakers, in opposition to this reduction, and it was rather an important point. They supplied gas to a considerable number of persons outside the borough, who took no part of the burden of the rates, and, he asked, should they

Statement of Accounts for the Year ending June 30, 1879.

No. 1.—ANNUITY CAPITAL.

Description of Capital.	Maximum Yearly Annuity.	Number of Annuities Issued.	Nominal Amount of Annuity.	Total Amount Received.	Remaining to be Issued.	Total Amount Authorized.
	£ s. d.		£ s. d.	£ s. d.	£ s. d.	£ s. d.
Annuities	3 5 0*	7242	50 0 0	369,434 5 0	430,565 15 0	800,000 0 0

* Up to May 8, 1891, these annuities are of the value of £3 2s. 6d. each.

No. 2.—LOAN AND DEBENTURE CAPITAL.

Description.	Rate per Cent.	Total Amount Borrowed.	Remaining to be Borrowed.	Total Amount Authorized.
Bonds, mortgages, and loans	£4 0 0	£72,130 0 0	—	—
Debenture stock	4 0 0	105,544 0 0	—	—
Premiums on ditto	—	1,728 17 0	—	—

Total annuity capital raised	£369,434 5 0	
Total loan capital raised	72,130 0 0	
Total debenture capital raised	107,272 17 0	
		£548,837 2 0

No. 3.—CAPITAL ACCOUNT.

—	Expenditure to June 30, 1878.	Expended this Year.	Total to June 30, 1879.
Expenditure to June 30, 1878	£503,622 10 3	—	
Since that date—			
Lands acquired	—	—	
New buildings, manufacturing plant, storeage works, and other structures connected with manufacture	—	£9,424 5 9	
New mains, laying, paving, &c.	—	2,705 8 5	
New meters	—	2,104 17 8	
Cost of promoting special Act	—	812 12 6	
	£503,622 10 3	£15,047 4 4	
Total expenditure	—	—	£518,669 14 7
Balance capital	—	—	30,167 7 5
			£548,837 2 0

—	Certified Receipts to June 30, 1878.	Received during the Year.	Total Receipts to June 30, 1879.
7242 annuities, of the nominal value of £50 (actually raised by the late Company)	£369,434 5 0		
Bonds and mortgages	87,771 0 0		
Debenture stock	56,759 8 4	£50,513 8 8	
	£513,964 13 4	£50 513 8 8	
Less loans repaid	—	15,641 0 0	
	£513,964 13 4	£34,872 8 8	£548,837 2 0
			£548,837 2 0

No. 4.—REVENUE ACCOUNT.

To Manufacture of gas—			By Sale of gas—		
Coals, including carriage, unloading, and expenses of depositing on works	£47,678 13 7		Private consumption {3s., 2s. 11d., and 2s. 10d. / 2s. 10d., 2s. 9d., & 2s. 8d.}	£109,391 1 11	
Purifying materials, oil, water, and sundries at works	2,549 12 8		Public lights	5,874 5 10	
Salaries of Engineers, Superintendents, and Clerks at works	2,392 5 7		Rental of meters	4,884 7 1	
Wages and gratuities at works	21,902 8 10				£120,152 14 10
Repairs and maintenance of works and plant (including renewal of retorts), machines, apparatus, tools, materials, and labour	18,004 14 7		Residual products—		
	£92,527 15 3		Coke and breeze, less labour and carriage	£12,237 13 2	
Less old materials sold	502 5 7		Tar	12,357 3 7	
		£92,025 9 8	Ammoniacal liquor	4,748 8 3	
Distribution of gas—			Refuse lime and other purifying material	273 12 7	
Salaries of Inspectors, Clerks in Light Office, and wages	£5,775 2 10				29,616 17 7
Repair, maintenance, and renewal of mains, including wages, service-pipes, &c.	2,127 16 6		Sundries—		
Repairing and renewing meters	809 7 6		Meters, service-pipes, brazework, and materials of distribution		1,870 7 8
		8,712 6 10	Fines and penalties		—
Public lamps—			Amount from reserve-fund		—
Lighting and repairing		208 17 2	Receipts for lighting, cleaning, and repairing lamps		—
Rents, rates, and taxes—			Incidental receipts		380 16 7
Rents and acknowledgments	£166 3 0				
Rates and taxes	2,468 8 3				
		2,634 11 3			
Management—					
Salaries of Clerk to Committee, General Manager, and Clerks	£1,835 10 0				
Collectors	1,057 10 0				
Stationery and printing	679 14 2				
General establishment charges and incidentals	691 14 5				
Auditors	65 15 0				
		4,330 3 7			
Law and parliamentary charges—					
Law		148 9 2			
Parliamentary (oppositions)		—			
Bad debts		537 1 10			
Sundries		—			
Balance		43,423 17 2			
		£152,020 16 8			£152,020 16 8

No. 5.—PROFIT AND LOSS ACCOUNT (Net Revenue).

Interest on loans	£3,279 2 10	Balance brought from revenue account, No. 4, being profit for the year ending June 30, 1879	£43,423 17 2
Ditto on debenture stock	3,027 7 9		
Annuities	22,159 16 6		
Balance	14,957 10 1		
	£43,423 17 2		£43,423 17 2

No. 6.—RESERVE AND SINKING FUND ACCOUNT.

Amount of balance carried to next account	£43,487 9 1	Balance brought from last account	£34,368 14 8
		Balance of profits, June 30, 1878	7,521 15 7
		Interest on amount invested	1,593 18 10
	£43,487 9 1		£43,487 9 1

No. 7.—STATEMENT OF COALS.

Description of Coals.	In Store, June 30, 1878.	Received during Year.	Carbonized, or Used during Year.	In Store, June 30, 1879.
	Tons.	Tons.	Tons.	Tons.
Common	5535	94,699	95,103	5131
Cannel	327	2,386	2,610	103

No. 8.—STATEMENT OF RESIDUAL PRODUCTS.

Description of Residual.	In store, June 30, 1878 (estimated).	Made during Year (estimated).	Used in Manufacture during Year (estimated).	Sold, &c., during Year.	In Store, June 30, 1879 (estimated).
Coke and breeze . Tons.	2,202	58,812	23,271	35,562	2,181
Tar . . . . . Galls.	92,578	1,182,643	—	1,069,111	206,110
Ammoniacal liquor ,,	153,314	1,972,611	—	1,903,271	222,654

No. 9.—GENERAL BALANCE SHEET.

To Capital account—		By Amount invested, reserve and sinking fund	£43,487 9 1
Balance at credit thereof, No. 3	£30,167 7 5	Cash at Bankers	31,637 0 11
Profit and loss account—		Stock on hand, June 30, 1879—	
Balance at credit thereof, No. 5	14,957 10 1	Coals	2,241 15 0
Reserve-fund account—		Coke and breeze	400 10 0
Balance at credit thereof, No. 6	43,487 9 1	Tar and liquor	2,716 18 9
Sundry tradesmen and others, for amount due for coals, stores, &c., to June 30, 1879	952 5 9	Sundry stores	5,563 18 0
		Arrears outstanding	254 3 1
		Coke and other residuals	2,782 6 5
		Sundry accounts	480 11 1
	£89,564 12 4		£89,564 12 4

benefit a large portion of the community outside the boundaries? There was another question whether they were not bound to give the profits to the relief of the rates of the town?

Alderman THACKERAY, in reply, said that, with regard to what fell from Mr. Lindley, he seemed to have quite overlooked the figures in the Committee's report. In that he would see "Repairs, maintenance of works and plant, including renewal of retorts, &c., £18,004." Was not that satisfactory enough?

Mr. LINDLEY: No.

Alderman THACKERAY asked why. They had been quoting Manchester, but this was the first time he had ever heard Manchester mentioned in this regard, for, as a matter of fact, the gas there had been excessively dearer than in Nottingham, so that it was no wonder they obtained large profit. If they did not reduce the price of gas, people would say the Corporation were grasping everything, and that was the cause of their having to pay more. If the concern had been in the hands of the Company, gas would now have been about 2s. per 1000 feet, their statutory provisions compelling them to lower the rate in proportion to the profits. It was not right to say that it would be unfair to the small consumers. He did not wish to tax them, but to do justice to all. The reserve-fund paid interest, and he thought it should be kept strictly to itself. He wanted to see it reach £100,000, when it should stop, and the interest would go in some measure to provide what they would have to pay off hereafter by Act of Parliament. They could reduce the price of gas 2d. per 1000 feet, and have a balance of nearly £20,000 at the end of the year. Probably, if they did not accept the Committee's recommendation, they would produce a very bad impression, and it might be said, if they did not reduce the price of gas they would have the electric light, while their prosperity would be maintained by lowering the price of gas.

The amendment was put to the meeting, when there were 18 for and 14 against it. The amendment, as a substantive resolution, was then carried, 20 voting for it.

NORTH BRITISH ASSOCIATION OF GAS MANAGERS.

(*Continued from page* 259.)

Mr. W. COWAN (Edinburgh) read a paper entitled

THE AUTOMATIC PRESSURE CHANGER.

The gas governor, though automatic in action, is only so in relation to one pressure at a time. When that has to be changed, weight in some form must be transferred, and this is equally the case, whether it acts directly upon the governor, or indirectly through the agency of pneumatic pressure. In either case, the amount of weight must be varied whenever the pressure has to be changed.

That the loading material may produce its effect without disturbance, it is of importance that it should admit of convenient subdivision and easy transference. Though metal weights have the advantage in point of bulk, they cannot compare with water, either as regards ease of application or gradual effect. This has been freely admitted by various writers, including Clegg, Newbigging, Richards, and others. Water loading thus approved, and further recommended by experience, would doubtless ere now have become general, had certain drawbacks to its use not existed.

To open or close a tap is the work of a moment, but unless the proper interval between these operations be carefully observed, too much or too little water may be transferred, and the desired pressure not established. Further, till my invention of the stationary syphon for withdrawing the water, the pipe through which that was done (if not flexible) could not have upon it any tap in a fixed position. If the pipe was flexible and the tap stationary, the pipe acted as a drag upon the bell; while if rigid, its tap of necessity moved with the bell, to which, in being operated, it was apt to cause disturbance. A stationary tap could thus only be obtained on condition of there being a flexible connection. My syphon, having no contact with the bell, at once secures the former, and removes the necessity for the latter. Subject, therefore, to the condition that the taps be duly opened and closed, the stationary syphon may be considered as having introduced a perfect system of water loading.

All risk of disturbance to the governor being thus excluded, water loading comes to be simply a question of opening two taps at certain times, and closing them when they have allowed water to pass to the necessary degrees. Some may think it sufficient to have this duty done by hand, as hitherto; but, those who may be relied upon to perform it with the necessary regularity and precision, are by no means numerous, and their time and services might be usefully employed in the performance of other duties. I desire to say nothing against the way in which a most valuable class of men have been in the habit of performing their duties; and though what I propose is designed to relieve them of some of their functions, no loss will be theirs, while considerable gain should result to their employers, through the advancement of economical and satisfactory distribution of the gas supply.

In addition to perfecting the pressure arrangements in gas-works, it will now be practicable to employ governors giving varying pressures in localities where only those of the differential class have hitherto been admissible. The saving of gas to be effected in this way alone seems to me a complete justification of my invention. The inducement to concentrate governors, as much as possible, in or near the gas-works, or to place them only where a man to vary the pressure may be conveniently available, will now cease. These remarks apply to gas-works generally; but for those of smaller extent, where the manager himself changes the pressure, it will be a matter of both comfort and convenience to have the means by which this may be done without his presence being necessary.

But to return to the machine. The two taps are opened through the action of the clock, because this has to be done to time, and of that the clock is the measurer. The closing of the taps is effected by the gasholder, operated by the pressure which the action of the clock induces, and the degree of which the gasholder determines. You will probably see in this the real essence of the invention, and what I venture to think is its most important feature. All the other parts are accessory and subordinate, but this is essential.

I will assume that all present are more or less familiar with the apparatus, or will become so by an examination of the one here exhibited in action. Instead, therefore, of describing the machine, I will rather direct attention to some points I did not refer to in the paper I read at Newcastle, before the British Association of Gas Managers.

By the kindness of Mr. Woodall, Engineer of the Phœnix Gas Company, London, I was allowed to put the Changer to a practical test of the most severe character, and thus to obtain information in regard to its working, which I have turned to practical account both before and since the Newcastle meeting.

It will be readily understood that if the main into which a governor delivers is liable to be influenced by pressures from other sources of supply with which it may be (even at a considerable distance) connected, a pressure-gauge on the governor outlet will, in such a case, give no uniformly correct indication of the pressure the governor gives. When the pressure of the governor is less than that which is coming from other sources, the gauge will indicate the latter alone, and only when the "back" or foreign pressure falls below that from the governor, will the gauge be of any value as a guide in the loading or unloading.

When a man has to attend to a governor so circumstanced, his position is, at times, one of no little anxiety, because the gauge frequently indicates what is being done by others, rather than the result of his own operations. The same remarks will apply to the use of a pressure register, which, in addition to being employed to record the pressures in the main, is supposed to act as a check upon the man in charge of the governor. That it answers the former purpose is true, but that, with foreign pressures in the main, it can answer the latter, is simply impossible. Just as a gauge on a main subject to foreign pressures affords no true indication of the degree to which the loading or unloading of the governor immediately supplying it has proceeded, so a pressure register, in similar circumstances, can give no accurate record of the pressures produced by these operations. What it *does* register, in such a case, is the pressure in the main, but the sources of that pressure it cannot make known. As a check, therefore, on the loading and unloading of any governor, except one on an independent main, a pressure register appears to me to be of no value whatever.

When the Automatic Pressure Changer is attached to a governor liable to be influenced by foreign pressures, in the way Mr. Woodall described, its gasholder must not be connected with the gas-main, because the pressure there would not invariably (for the reasons above given) be due only to the effect produced by the loading or unloading of the governor. In such a case the pressure employed to actuate the gasholder must come from a source free from any other influence than that which may be due to the Changer itself.

During the discussion at Newcastle, Mr. Woodall stated that I had found such a source of pressure in the regulating vessel of the Foulis Governor, and that the plan of connecting the Changer with it had proved successful. I have, in connection with the machine before you, endeavoured to show another method having the same object, which is applicable to governors of every kind, including the Foulis.

In this case I employ an air-holder to actuate the holder of the Changer, which is capable of being loaded with water by means of supply and syphon pipes, in the same manner as the governor. The supply-pipe, which proceeds from the Changer tap, is divided into two branches, which are connected to a check-tap, through which are two passages. From these passages, pipes are led to the governor and air-holder respectively. The check-tap is so constructed that, when fully open, it allows the proper relative proportions of water to pass to the governor and air-holder. Thus when water sufficient to load the air-holder to any given pressure has been passed, the amount of water necessary to produce the same pressure in the governor has been supplied to it. Further, in reducing the flow through the check-tap, the passages retain their relative proportions, thus admitting of any alteration being made in the flow, when it is desired to vary the time occupied in raising the pressure. Thus a pressure-gauge on the air-holder gives an exact indication of the pressure which the water supplied to the governor will produce, although a gauge on the gas-main would, in the event of foreign pressures of higher degree being present, give a different result.

For the syphons, a slightly different arrangement is necessary, because they must be entirely separate from each other through their whole length. The reason of this will be obvious. It would be practically impossible to secure that their shorter legs should, under all circumstances, remain of exactly the same length. Any variation in this respect would convert them into a syphon, which would act independently (on the closing of the tap), and derange the proportionate loading of the two vessels.

The syphons being thus distinct, an extra passage in the Changer tap, by which they are opened and closed, is required, and accordingly provided. This necessitates the doubling of the syphon bye-pass, but as this necessity arises from a provision absolutely essential in dealing with governors subject to foreign pressures, it cannot be considered in any sense a complication, though at first sight it may, to some, appear so.

The syphons are provided with a check-tap of the same construction as the one on the supply-pipe. By this means the time occupied in lowering the pressure may be varied as required.

By this system of what I may call "inferential" loading and unloading, the governor is placed in a position to give the desired pressure, and therefore will do so, whenever that which may be due to other sources fails, or is withdrawn. It corresponds to the placing or removing of a weight known to be capable of producing a certain change of pressure, but regarding the effect of which (should foreign pressures be present) a gauge on the gas-main would afford no information whatever.

The Changer, by thus loading and unloading in accordance with indications derived from a gauge on a vessel free from any other influence than that of the Changer itself, gives to water loading the same definite character as the weight above referred to possesses, while retaining the gradual nature of its operation. This appears to me to be no small advantage, even considered by itself, apart altogether from the further great advantages of automatic action.

The automatic action may either be complete, as in the machine before you, or limited by the omission of some of the parts. For example, the clock might be dispensed with, and the automatic action of the gasholder to close the taps be retained. In this case the levers, which in the complete machine are operated by the clock-disc, would be moved out of catch by hand, or otherwise. This, it will be observed, meets one of the chief difficulties in the way of ordinary water loading, by reducing the attendance to that necessary for the *opening* of the taps.

The uselessness of a pressure register as a check upon a governor in certain circumstances, I have already pointed out; but it must not be inferred that I am opposed to the employment of that useful instrument when properly applied. On the contrary, I have provided for its use in connection with the air-holder to which I have referred, and so restored it to the position it ought to hold, as a correct recorder of pressure changes.

The arrangement shown includes a pressure register, the cylinder of which is driven by the clock of the Changer, while its bell is actuated by the inferential air-holder, and so gives a true record of the pressures produced.

The larger of the two gasholders is intended to represent a governor. The smaller is that which works the pressure register and Changer holders, and is also that, from the loading or unloading of which I infer the result of the same operations coincidently produced upon the governor.

Where there is no other pressure in the main than that supplied by the governor, the arrangements I have described are unnecessary. Foreign pressure being absent, provision against it would be superfluous. In such a case, the gas-main supplies the only source of pressure the Changer requires, and this may be made to influence it either directly or indirectly. Gas may be conveyed into the small holder, or its pressure may be exerted through the agency of air. For this purpose I employ an annular vessel hung on an axis, and divided transversely, in one place, into two portions. Part of the circumference being removed, the vessel forms practically two semi-circular gas or air holders, sealed in the usual way by immersion in a water-tank. One of the divisions contains air, and is connected by a pipe with the Changer holder; while the other has a pipe led into it from the

gas-main. The pressure of the gas, when increased, turns the vessel on its axis, and so drives the air out of the other division into the Changer holder. When the gas pressure is diminished, the air, by moving the vessel in the opposite direction, forces the gas back to the main. There is thus no necessity for using gas directly to actuate the Changer.

The PRESIDENT: I think we are all agreed that this is a fine piece of mechanism, and perhaps the day is not far distant when we shall have one at our works. It has many advantages, and it is calculated to save a great amount of labour. Being automatic in its action, it is sure to do the work correctly. I would move a hearty vote of thanks to Mr. Cowan for his paper.

The motion was agreed to.

Mr. DAVID TERRACE (Arbroath) read a paper on

WORKING STATISTICS.

In offering a few remarks on this subject, I would draw attention more particularly to the discrepancies in the working results obtained in various gas-works.

Seeing that such a society as this has existed for so long a period, one would suppose that the actual work done throughout the year, in one works compared with another, would be nearly alike; but, instead of this, we find the greatest differences arising. For instance, beginning with the retort-house, the quantity of gas made per mouthpiece per day is found to be 5000 feet in some works, while in others 8000 feet are obtained. The production per ton of coal carbonized is said to be under 10,000 feet in one place, compared with over 11,000 in another. Thus the amount paid for carbonizing wages, &c., is greatly increased for the lesser quantities, not to mention the destruction of the extra material and plant required.

These results might be due to the method of setting the retorts; also, in some measure, to the kinds of coal used, and the length of time the charges are worked. It does not seem to be a settled point whether 3, 3½, or 4 hour charges are best, and each manager has his own proportions of first, second, and third class coals. It ought now to be well known whether settings of three or five retorts in one oven are most economical to work. Settings of five to one furnace are being adopted, but the ordinary plan is three retorts to one furnace. There are, however, instances where two furnaces are employed to heat three retorts.

So far as I am aware, there are no data as to the quantity of coke used as fuel in proportion to the quantity sold. As a basis, it might be mentioned that if two-thirds of the coal carbonized produces good coke, this will be sufficient to keep the furnaces and also the steam-boiler supplied with fuel.

The gas produced per ton of coal used should be within from 5 to 10 per cent. of the analysis quantity, and this percentage should be worked out daily, or as often as there is a change made in the quantities or kinds of coal used.

The quantity of ammoniacal liquor produced by scrubbing materially increases the revenue from the secondary products. Some gas-works are still without any provision for extracting ammonia, while good and efficient apparatus is employed in others. As the total expenses of erecting such appliances might be repaid in the course of from three to six years, it is surprising that scrubbers are not more generally adopted.

The cost of purification varies in different works. Material and labour, where lime is used, is found to cost about 1d. per 1000 feet made; from 4 to 5 million feet of gas being passed through each purifier before changing—that is, when using a range of four purifiers. It now appears to be ascertained that it is better to place the lime on one or at most two tiers of sieves, than spreading it thinly on three or four. When one tier in each purifier is used, the lime is from 24 to 30 inches thick; with two tiers it is from 10 to 12 inches thick. By this means back pressure is reduced to a considerable extent. When the lime is properly worked, it should be taken out of the purifiers in a solidified state. I have not mentioned oxide of iron, as it is not in general use; but it appears it is used with advantage along with lime. If those who treat it in this way were to give their experience, it would prove of benefit to the members.

Although the station-meter is an instrument made for correct measurement, it surely is not in true working order in some works, as the production per ton of coal carbonized varies so much, even where it may be supposed the same class of coal is used, and equally good work done in the retort-house. At best the make per ton ought only to be taken as a relative, and not as an actual quantity. Some station-meters may be too small for the work to be performed, and so be over-driven, which may partly account for the difference in registration. More stress ought to be put on the quantity sold per ton, as the measurement at consumers meters is the real test. It appears better work to produce 11,000 feet per ton and sell 9000, than it does to make 10,000 and sell 9000, the result being the same in the end; but the party who produces the greater quantity is generally credited with the better management. The leakage in the one case is about 18 per cent., while in the other it is 10 per cent. The reduction of leakage ought at least to be held of as much importance as a great production per ton.

The foregoing are only a few of the examples of the variations of the mode and cost of working, but I think they are sufficient to show that very great improvements might be effected in many gas-works.

No notice has been taken of the proportions and kinds of condensers and other appliances, but enough has perhaps been said to attract the attention of members to the variations in the working results obtained. In other manufacturing trades the aim is to get the greatest returns for the smallest cost of raw material and labour, and this being held as a true commercial principle, it ought to be steadily kept in view in the process of gas manufacture.

I presume each one is most willing to assist his neighbour, and in the case of those who are getting inferior results, they should consult their brother managers, as by this means they might be able to put their works in a more satisfactory state. There should be no exclusiveness, and no secrets, so called, as to how each manages his works, and it would greatly tend to the benefit of all if more opportunity were taken of free intercourse and interchange of opinion with each other. Our yearly meetings afford little scope for full discussion and full statistics being given on all the points indicated; but if each were to fill up certain forms giving the various detailed workings and their results, it would help in a great measure to further the interests we all have in view—viz., the bringing to the greatest state of perfection the industry in which we are engaged.

Discussion.

Mr. ROBB (Haddington): This is a most important paper, and one which ought to receive the attention of all. I have been very much interested in the discussions which have taken place since Mr. Scott, jun., read his paper before the West of Scotland Association, and I have had the curiosity to go over the circulars containing the analyses of coal which have been sent to me for the past 30 years. In one word, I may state that I have 116 analyses of parrot coal, yielding above 10,000 cubic feet of gas per ton, the average being 11,392 cubic feet; and that I have 44 analyses yielding less than 10,000 cubic feet per ton, the average being 9383. Adding the two together, we get an average of 10,387 feet. Looking at these figures, and comparing them with the yield in actual working, I find in Dundee that they get 11,394 cubic feet per ton, which is a little over the figures in my possession. In Galashiels they get 10,307 cubic feet per ton, and in a small works making 6 millions—that is, Innerleithen—they get 10,250 feet. Dividing these results by three, we find that 10,650 feet is the yield of gas per ton in practical working. I do not know how those people who find fault with chemists for supplying their analyses can, in the face of the figures I have quoted, justify or reconcile their statements. I find that the chemists are not at fault. The fact is we are getting more than we are told we shall get out of the coal. I trust that some young man will investigate this question, and give us a paper on the subject at our next meeting.

Mr. YOUNG: Perhaps Mr. Robb will kindly mention what he gets himself.

Mr. ROBB: I am enthusiastic in some points, but really I am not so enthusiastic as to state my own results.

Mr. MILLER (Innerleithen): Mr. Robb, in his statement, has mentioned three towns, and he states what they get per ton at the station-meter. I have 10,250 cubic feet per ton at the station-meter, and I am paid for 9060, which gives a leakage of 11 per cent. Mr. Terrace spoke about the varyings of the station-meter, but the results I have stated show that my station-meter must be nearly correct. I am not quite at one with him as to the lime being put on sieves 15 inches thick. I have tried it. It is all very well if you have an exhauster to draw or force the gas through, but if you have not an exhauster you will not be able to put it through 15 inches of lime on each sieve.

Mr. M'GILLIVRAY: I think we ought not to let this matter drift into how much each individual manager can take out of a ton of coal. We should view the subject from a broader point of view, and turn our attention to the important points—the amount obtained per ton, the amount sold, and the passing of the gas through a thick layer of lime. These are matters with respect to which we only arrive at conclusions by practical experience; but I think it is a fallacy to compare one works with another, or one manager with another, on these points. My reason for saying this is simple and obvious. Every district is surrounded by circumstances which regulate the supply, and which are peculiar to the situation of the district. In one town you may find a number of meters on the line of main and the leakage very small, and in other towns, with a lesser number of meters on the main, the leakage might be large. These and other matters can afford no criterion as to the results obtained, unless we have the actual leakage stated in each case. Then, as to the hints about the lime, I can scarcely agree with Mr. Terrace. I cannot see how gas can be forced through lime 30 inches thick.

Mr. ESPLIN: This paper shows that Scotch gas companies should give greater attention to one feature of the manufacture—that is, the commercial value of the residuals. I gather from a speech made by Mr. Woodall that the total cost of coals per ton at his works averaged 13s. 6½d., and he realized 10s. 4½d. from the residuals last year. That is a price which perhaps we cannot expect to obtain; but there cannot be the slightest doubt that a greater revenue ought to be derived from the sale of residual products, and on this point I strongly endorse what Mr. Terrace has said.

Mr. WHYTE (Seaham Harbour): I think that it is most unfair to give a manager credit for good management because he happens to get 10,000 or 10,500 cubic feet of gas per ton of coal, since it may be that his neighbour, who is getting only 9500, may be the better manager of the two. We do not know all the circumstances relating to the individual cases, and circumstances alter cases everywhere. Then, again, it is not the manager who shows the least leakage who is in the best position. I know a place where the manager cannot produce more than 7000 feet per ton at the consumer's meter, yet in the circumstances he is perhaps as successful and as good a manager as his nearest neighbour, who may be measuring 10,000 feet. It depends on the different circumstances of the works.

Mr. HISLOP: I have only one or two remarks to make in connection with this subject. We are certainly indebted to Mr. Terrace for introducing it. I would observe that the indication of gas made by the station-meter might be the result of a defect in the condensing apparatus, or it might be due to the purifiers, &c., being too small, because, where the gas is forced through with considerable velocity, the friction tends to raise the temperature of the gas; but in those cases where it is measured at the high temperature, the leakage will necessarily be large, and, therefore, the one thing will be a check on the other. In reference to the thickness of the lime, I do not quite agree with Mr. M'Gillivray. For many years, in my earlier experience in gas management, I used to employ even four trays of lime in the purifier, but for some time I have abandoned that method of working, as experience has taught me that so many trays in a purifier tend very much to increase the pressure. In practice, therefore, I never put more than two trays of lime or oxide of iron into a purifier, and I find that the pressure is greatly reduced. If the lime is properly prepared, too, I am certain that there will be less pressure than by introducing lime in solid pieces into the chamber. I find no difference in pressure with 18, 20, or even 30 inches of lime. I have advised other managers to try this plan, and they have considered it an improvement. Lime, to be in proper order, ought to be prepared a week before it is put into the purifier, and it is a mistake to put in lime recently slaked with water. If prepared a week before being used, it ought to be in good order; but if the particles adhere they can be easily broken down. If the lime is prepared in this way, I do not care what thickness you have on the trays, you will undoubtedly have a reduction of the friction caused by the passage of the gas. In practice, I only use one tray of oxide of iron, and when it is slightly mixed with sawdust, the resistance I find to be very small. The thickness of the lime and oxide varies from 24 to 30 inches. In reference to analyses, I believe it will be found that the deficiency arises from the second and third class coals used. These contain a large proportion of water, and undoubtedly they will not give the same results, by a long way, if, immediately on their arrival at the works, they are applied for the production of gas. You will readily understand that when I state that some of these coals contain 12 per cent. of water, I find within certain limits that the percentage of water will affect the results by 5 per cent. In comparing these results, therefore, care should be taken to see that the conditions named in the analyses are the same when the experiments are made, and only then can a proper comparison be made as to the results obtained.

Mr. MITCHELL (Dundee): It is no part of the object of this Association for any one to come up here and say, "I can do so and so at my works." We should distinguish ourselves from the general public. The public, as you all know, are apt to be misled by the quantities of gas registered at the station-meter; but we are expected to know better. Some people go to the length of expecting a uniform price for gas in Scotland and England. They do not know that gas is much superior in Scotland as compared with England, but they draw comparisons, and say that the price in the one country is double that in the other, while they ignore the fact that in the one case there is double the amount of light. In receiving statements as to our working details, however, we do not require to be under the same influence. Now, supposing we hear of a works producing a large quantity per ton, we need not rush to the conclusion that some-

thing is wrong with the station-meter, or that the leakage is higher there than in other towns. We know quite well that the practical result, so far as pounds, shillings, and pence are concerned, is the quantity passing through the consumers meters. Again, although we understand that in a certain town the quantity passing through the consumers meters may not be larger than in another town where the make is less at the station-meter, we need not rush to the conclusion that the station-meter is wrong in the town which gives the large make per ton at the station-meter. The one thing has nothing to do with the other. There may be a large make at the station-meter, but a larger number of main and service pipes in the one case compared with the other, and this may account for the leakage. Mr. Terrace also made reference to the use of lime and oxide, and if any information I can give will be of advantage, I will give it. In Dundee our purifying apparatus consists of two sets of purifiers, 20 feet square by 4 ft. 6 in. deep, worked by centre-valves, three in action in each set. In the lower tier we use lime about 6 inches thick, in the second tier we use oxide from 8 to 10 inches thick, and in the third tier oxide about 8 inches thick. If I had had the balance-sheet, I should have been able to show the figures relative to the purifying arrangements for the past year; but I do not have it. I may say, however, that since we began to use oxide in a systematic way, the saving effected last year over previous working was to the extent of from £300 to £400. That is brought about by merely using oxide in place of lime. We have a revivifying arrangement for the oxide, so that we can now make a better use of it than formerly; and then we have a labour-saving apparatus for lifting the oxide from the purifiers, and spreading it on the floor of the revivifying shed, which is 14 feet above the purifiers, where, from its exposed position, the oxide is revivified to a greater extent and more safely than when spread on the ground in an adjacent shed.

Mr. M'Gilchrist: I think the make per ton is a false basis to go upon. The consideration ought to be, what is the cost per ton?

The President: I do not think we need go into that again.

Mr. Mitchell (Coatbridge): I beg to move a hearty vote of thanks to Mr. Terrace for bringing the subject before the meeting.

Mr. Young: With all deference to the chair, I think it would be advisable to allow the discussion to proceed.

The President consenting,

Mr. M'Gilchrist proceeded: The question we have to deal with is not whether we make 11,000 or 6000 feet—it is what it costs per 1000, and the manager who makes gas at the lowest rate per 1000 is perhaps not the most successful. Then in regard to the setting of retorts, I think this would form the subject of a good paper at our next meeting, because there is no part of our apparatus in which there is so much diversity of opinion as in the setting of the retorts; and, curiously enough, it is the most important part of our apparatus. In Dundee, where the make is perhaps the highest per ton, they have only one furnace to three retorts. In Edinburgh and Leith they have two furnaces to five retorts; in Greenock they have two fires for five large D retorts; and in Coatbridge, one of the most recently-erected works, they have an excellent setting of five retorts to one furnace. If Mr. Mitchell can heat his five retorts with the same amount of fire as three retorts in other places, that is undoubtedly the best arrangement. In reference to the scrubber, I know works where within the past year a scrubber was erected, and in one year they were able to pay more than the total cost of the whole scrubber, in this way not only bringing profit to the company, but securing to the public gas free from ammonia—a most desirable consummation.

Mr. Scott (Falkirk): Mr. M'Gilchrist, in the course of his remarks, said that the manager who makes the gas at the cheapest rate per 1000 feet is often not the most successful. In dealing with that question, I think we ought to take into consideration the peculiar circumstances of each particular case.

Mr. M'Gilchrist: In considering this question, no doubt we must take into account the cost of the raw material as delivered into the retort-house. If one pays 20s. in his works, and another 15s. for the same coal, it is clear that the latter has an advantage to the extent of 25 per cent. But it is the principle of the thing that I am speaking of.

Mr. Young: We have to thank Mr. Forstall, of New Orleans, for the discovery that layers of lime can be used to a great depth without bringing about any great resistance. He said that it could be used from 30 inches to 36 inches in thickness without much resistance being experienced. I can corroborate this statement. In Clippens, at the present moment, we use something like 3 feet of material in removing the sulphur compounds. In regard to the production of gas from the coal, that very much depends on the locality of the works. There are many matters of detail which come into consideration, and which render comparison difficult.

Mr. Terrace: I should like to ask whether there are three or five retorts to one furnace in Dundee.

Mr. Mitchell: I may say in Dundee we built an oven of five retorts and one furnace as an experiment, and we had it working for the greater part of the season, and I may say in a word that a saving of 30 per cent. of coke was effected by having five retorts in one oven as compared with three.

The President: We are much indebted to Mr. Terrace for his excellent remarks, and, as our time is now exhausted, I think a Committee should be appointed to revise the report of the proceedings.

A Committee was accordingly appointed.

Votes of Thanks.

A vote of thanks was accorded to the various gentlemen who sent exhibits to the meeting.

Mr. Whyte (Seaham Harbour) moved a vote of thanks to the President.

Mr. Robb seconded the motion.

Mr. M'Gilchrist: I heartily concur in the vote of thanks to the President; but there is still another gentleman who is vacating office at this time, who also deserves the heartiest thanks of the Association—namely, our Secretary, Mr. Mackenzie. I think we are unfortunate, in one sense, in having such a modest man as Mr. Mackenzie as Secretary. As a Committee we endeavoured to prevail upon him to accept the presidentship as a proper termination to his official career; but he is of so retiring a disposition that he would not consider the proposition. I think something ought to be done to recompense him for the large amount of labour he has had in connection with the business of the Association.

Mr. Hislop: I have great pleasure in seconding this motion. I think our best thanks are due to Mr. Mackenzie for the long and important services he has rendered to this Association. To-day, in his absence, he was elected one of the Vice-Presidents, and I am sure we are all gratified that we are still able to retain him in connection with the management of the Association.

The President: I have only to return thanks for the kind way in which you have recognized my services, and I have no doubt but my successor will be able to perform the duties better than I have done.

Mr. Mackenzie: I do not know how sufficiently to thank you for the way in which you have recognized any little services I have been able to render to the Association. As our time is limited, I will simply say that I feel highly honoured by this kind expression of your appreciation of those services. As I have said before, it has been to me a labour of love, and I have had my reward in the kindly and instructive intercourse I have had with managers all over the country. I shall always look back upon the past with feelings of pleasure and satisfaction. I have no doubt our new Secretary and Treasurer (Mr. Terrace) will ably fulfil the duties entrusted to him, and I can assure him that I shall at all times be ready to give any assistance or advice in my power bearing on the welfare of the Association.

The proceedings were then brought to a close.

TRADE NOTES FROM SCOTLAND.

(from our own correspondent.)

Having formally taken over the gas supply of the town, the Burntisland Town Council at their monthly meeting, held last Monday, had under consideration the appointment of a Clerk and Treasurer to the Gas Commission. It had been contended that the Town Clerk should be *ex officio* the Clerk under the Gas Act; but that conclusion was disposed of by a letter received from Sir Windham Anstruther, the author of the Act, by a member of the Council, which was to the following effect:—"I am clearly of opinion that the Town Clerk in a burgh is not *ex officio* the Clerk, Treasurer, and Collector of the Commission in any burgh which has adopted the Burghs Gas Supply (Scotland) Act, which I introduced and carried in 1876. The Clerk must be appointed by the Gas Commissioners, who can appoint the person best qualified to discharge the duties of the office." On the motion of the Provost, it was agreed to make the appointment at a special meeting, which was held last Monday night, when the Town Council met for the first time as the Gas Commissioners. After the confirmation of the minutes of the preliminary proceedings, Mr. Wallace, the Town Clerk, was appointed the Commissioners Clerk, and Mr. Stein Pithie, the Solicitor and Burgh Fiscal, was appointed to the joint offices of Collector and Treasurer.

An adjourned statutory meeting of the Police Commissioners of Kelso was held last Monday evening, when the question of the lighting contract with the Directors of the Gas Company was again under consideration. The Water and Lighting Committee reported that the Directors were of opinion that any reduction in the contract price for the street-lamps of the town was uncalled for, and that in the interests of the whole of the consumers, as well as of the Company, it was unadvisable. The Committee's minute stated that the matter had been fully considered, and that they were satisfied that the sum now charged by the Gas Company was a fair one, and they accordingly recommended that the present contract should be renewed for another year, which was agreed to.

The annual general meeting of the Shareholders of the Gatehouse Gas Company was held on Monday, the 11th inst., when a dividend of 5 per cent. was declared payable to the Shareholders. Within the last two years the price of gas has been reduced 1s. 8d. per 1000 cubic feet, and it was resolved to continue the present price of 9s. 2d. per 1000 feet, being as low a rate as the Company can supply a good quality of gas at.

In the annual statement of income and expenditure for the past year just issued by the Glasgow Police Authorities, there are some interesting particulars connected with the lighting department, &c. The total expenditure for the lighting department was £25,187 5s. 6d., of which the largest item was for gas supplied to public and private lamps, and amounting to £16,322 11s. 2d. For lighting private lamps, the bridges over the Clyde, barricade lamps, and for broken lamps and sundries sold, the receipts amounted to £3858 19s. 6d. Under the head of "Lighting of common stairs" there was an expenditure of £20,175 10s. 4d., of which £13,476 1s. 9d. was for the gas consumed, and £6568 0s. 5d. for wages of the stair lighters, &c. For the year ending the 15th of May the lighting account of the Edinburgh Police Authorities amounted to £12,690 9s. 4d., nearly one-half of which was for the gas supplied to the public lamps. The total amount of the lighting account in each of the four years immediately preceding was (omitting shillings and pence)—1875, £11,586; 1876, £10,967; 1877, £11,586; 1878, £11,677.

The Glasgow pig iron warrant market was very strong last week, and a large business was done at advancing prices. There was an improvement on Friday to the extent of 6d. per ton, and the advance over the week was 1s. 4d. per ton. As high as 43s. 3d. cash was paid on Friday afternoon.

A certain degree of activity exists in the local coal trade, and some qualities have advanced in price from 8d. to 6d. per ton.

The Purchase of the Colchester Water-Works by the Town Council.—At the last meeting of the Colchester Town Council, the Water Supply Committee reported that the notice requiring the sale and purchase of the Colchester Water-Works Company's undertaking was served, on the 21st of July, upon Mr. Tindell, the Clerk to the Company; and that they had directed the Town Clerk to request his agents to retain Mr. Edward Easton, C.E., as Arbitrator for the Council.

The Southbank and Normanby Gaslight and Coke Company.—The Auditors report of this Company's working for the past half year has just been issued, and it shows a profit amounting to from £450 to £500, which would enable the Company to pay an interim dividend at the rate of 6 per cent. As the Directors had, however, made considerable improvements on the works, and others were in progress, the estimated cost of the whole being about £1000, it would be necessary to meet this expense by making another call of 5s. per share. This being inexpedient at present, the Directors had resolved not to pay an interim dividend.

Leeds Corporation Gas Supply.—At the quarterly meeting of the Leeds Town Council last Wednesday—the Mayor (Alderman Addyman) in the chair—the report of the Gas Committee, which was adopted after the discussion reported in last week's Journal, was presented, and Alderman Bowen moved—"That the price of gas be reduced from 2s. 6d. to 2s. 2d. per 1000 cubic feet from the 1st of July last." He said that whatever might be the opinion of the members of the Council as to the advisability of such a reduction, it must be a pleasure to them to find that though the accounts were not fully made up, they were such as enabled the Committee to come before them with the proposal they did. If the price were reduced to 2s. 2d. per 1000 feet, there would still be, at the end of the year, a balance, according to the estimate, of something like £5000. The balance of profit from last year would exceed by several thousands of pounds what they expected when the estimate was made out. Mr. Ingham seconded the motion, which, after a short discussion, was agreed to.

Public Lighting in the United States.—The *New York Plumber and Sanitary Engineer* publishes the following particulars of the public lighting of some of the principal towns in America:—

Cities.	Gas Lamps.	Hours burning per Lamp per An.	Total Consump'n.	Total Cost per Lamp.	Total Annual Cost.
				Dols.	Dols.
New York	20,913	3833	240,457,490	19·70	477,226
Brooklyn	14,826	3790	168,571,620	26·50	481,766
Philadelphia . . .	11,986	3750	224,739,500	22·00	378,860
Chicago	10,760	2550	106,524,000	20·95	225,000
Boston	9,992	3828	153,997,500	40·27	459,082
St. Louis	7,151	2600	92,963,000	37·00	250,000
Cincinnati . . .	5,845	2500	58,450,000	21·00	131,000
San Francisco . .	5,255	2160	45,403,000	56·86	291,863

KNIGHTON GAS COMPANY.—The annual meeting of this Company was held on Thursday, the 7th inst.—Mr. J. M. ROCKE presiding. The Directors report, which was unanimously adopted, recommended the declaration of the usual dividend of 7½ per cent.; the placing of £40 to the reserve-fund; and the reduction of the price of gas to 5s. 5d. per 1000 cubic feet to consumers of less than 20,000 feet per annum. Those consuming upwards of 20,000 and under 50,000 feet, and those upwards of 50,000 feet per annum, to pay 4s. 11d. and 4s. 5d. per 1000 feet respectively. The retiring Director—Mr. Bowen—was re-elected; and Mr. W. James and Mr. G. T. Edwards were elected Directors in place of Mr. W. Banks and Mr. G. Watkins. Mr. W. A. Collins is Secretary of this flourishing little Radnorshire Company.

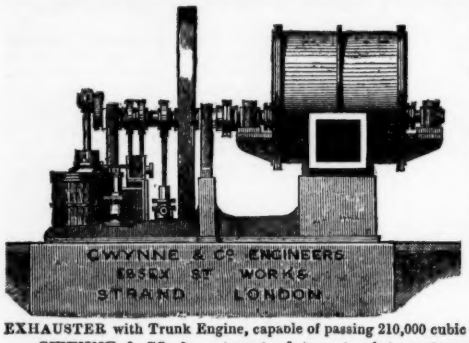
CARLISLE CORPORATION GAS-WORKS EMPLOYÉS ANNUAL OUTING.—The men employed at the Carlisle Corporation Gas-Works, numbering about 130, together with their wives and friends, had their annual excursion on Saturday, the 9th inst., the place of resort selected for the occasion being Morecambe Bay. A special train was provided, and the weather being beautifully fine, a considerable amount of enjoyment was experienced by all. There was a plentiful supply of both steam and pleasure boats, so that many indulged in a sail, while others drove in waggonettes to Lancaster, and inspected the Castle and other public buildings. Mr. J. Hepworth, the Engineer and Manager of the works, was one of the party, and the proceedings throughout were entirely successful.

PONTEFRACT GAS COMPANY.—The half-yearly meeting of this Company was held last Wednesday, when the Directors presented a report in which it was stated that the amount divisible among the Shareholders was £1664 11s. 4d., out of which they recommended the payment of a dividend for the half year ending June 30 at the rate of 10 per cent. per annum. From the accounts it appears that the total expenditure for the six months on revenue account amounted to £1145 11s. 4d.; while the receipts were £1710 10s. 5d. from sale of gas, £69 19s. 1d. for rental of meters, £400 4s. for residual products, and £4 5s. for sundries, making a total of £2184 18s. 6d. There were 1042 tons of coals carbonized, which cost, including carriage, &c., £517 11s. 6d. The total share and loan capital of the Company amounts to £17,300, and there has been expended on capital account to date £2783 15s. 8d. more than this.

GRANTHAM WATER COMPANY.—The half-yearly meeting of this Company was held on Wednesday the 6th inst.—Mr. Ridge, presiding. The Secretary read the report, which was as follows:—"The Directors beg to lay before the Shareholders the accounts for the half year ending June 30, which show a balance upon the revenue account in favour of the Company of £2895 6s. 7d. It is proposed to apply £2550 of the above sum to the payment of a dividend at the rate of 8½ per cent. per annum upon the old capital of £30,000, and £212 10s. in payment of a dividend of 8½ per cent. for the half year upon the £5000 new capital, leaving a balance of £132 16s. 7d. to be carried to the next account. The new main, which your Directors reported, at their meeting in February last, they contemplated laying down from the reservoir on Spittlegate Hill to St. Peter's Hill, has been completed, by which means the pressure throughout the town has been considerably increased, and the facilities of the manufacturers and maltsters very much improved. They are now drawing their attention to the parish of New Somerby, which, from its rapidly increasing population, naturally forces itself upon them for immediate attention, and they hope very shortly to have their mains extended throughout the whole of this important district." The Chairman said it was a matter for congratulation that, considering the depressed state of the whole commercial community, they were enabled to point with satisfaction to the present position of their undertaking. There was no doubt they were affected by this depression, seeing that both the manufacturers and maltsters, from whom they derived a considerable portion of their income, were affected by it; while, in consequence of the late excessive rains, they had lost much in regard to street-watering. Notwithstanding all this, they had increased their receipts and reduced their expenditure, in comparison with the corresponding half year of 1878. He thought this showed that the Company were in a very satisfactory state, and he hoped they would keep progressing until they attained their maximum dividend. He then moved that the report and statement of accounts for the half year ending June 30 be adopted, and that the dividends proposed therein be declared. This was unanimously agreed to. Mr. J. G. Thompson proposed a vote of thanks to the Chairman for his services. He assured the meeting that he made his office no sinecure, and worked, not only weekly, but daily, for the good of the Company. He thought the dividend was doubly satisfactory when they considered that the new capital of £5000 had not as yet got into full profit. In New Somerby, for instance, they were not receiving anything for their outlay. Dr. Robbs seconded the vote of thanks, which was briefly acknowledged by Mr. Ridge, who remarked that as long as he was connected with the Company he should continue to do his utmost to further its interests.

The GRAND MEDAL of MERIT at the VIENNA EXHIBITION, TWO MEDALS at the PHILADELPHIA EXHIBITION and TWO MEDALS at the PARIS EXHIBITION, have been AWARDED to GWYNNE & CO. for GAS-EXHAUSTERS, ENGINES, and PUMPS; Also 27 OTHER MEDALS AWARDED at all the GREAT INTERNATIONAL EXHIBITIONS.

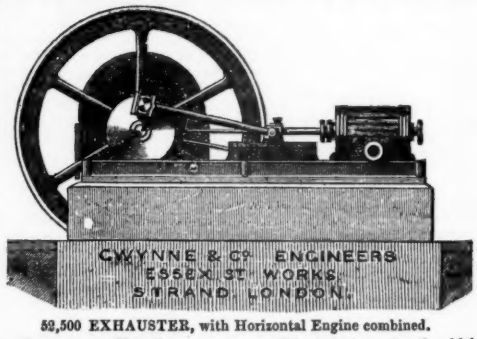
GWYNNE & BEALE'S PATENT GAS-EXHAUSTERS & ENGINES.



EXHAUSTER with Trunk Engine, capable of passing 210,000 cubic feet per hour.

The Judges report on the combined Exhauster and Steam-Engine exhibited at the Philadelphia Exhibition is—"*Reliable compact Machine, well adapted for the purpose intended, of excellent workmanship.*"

GWYNNE & CO. have made the largest and most perfect Gas-Exhausting Machinery in the world, and have completed Exhausters to the extent of 8,000,000 cubic feet passed per hour, of all sizes from 2000 to 210,000 cubic feet per hour.



52,500 EXHAUSTER, with Horizontal Engine combined.

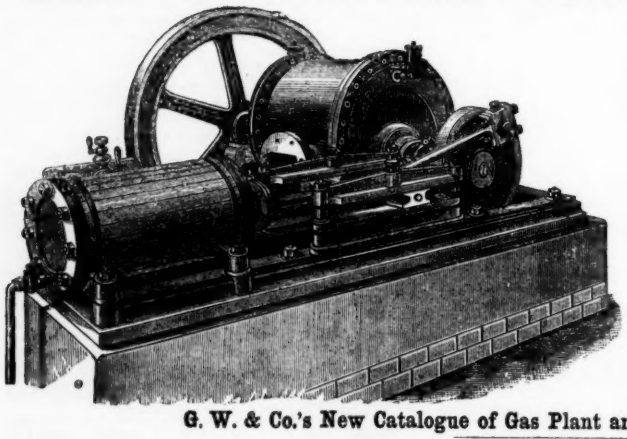
GWYNNE & CO. do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, *but to produce machinery of the very highest quality, and most approved design and workmanship.* The result is that in every instance their work is giving the fullest satisfaction. Numerous testimonials and references can be given to Companies using their Machinery for years past.

Exhausters, with or without Engines combined, can be made to pass the gas WITHOUT OSCILLATION OR VARIATION IN PRESSURE Regulators, Bye-Passes, Stop-Valves, Gas-Valves, Station Governors, and Gas Machinery of all Sizes.

PLEASE ADDRESS IN FULL, GWYNNE & CO., Hydraulic and Gas Engineers, ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON, W.C., ENGLAND.

Gwynne & Co.'s New Catalogue on Gas-Exhausting and other Machinery may be obtained on application at the above Address.

BEALE'S IMPROVED PATENT GAS EXHAUSTERS,



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Wrought-Iron Spindles and

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MAKERS OF ENGINES, EXHAUSTERS, INDEX AND DISC GAS-VALVES, HYDRAULIC MAIN VALVES, BYE-PASS VALVES, TAR, LIQUOR, AND OTHER PUMPS, SCRUBBERS AND PURIFIERS, CONDENSERS, BOILERS, &c.

G. W. & Co.'s New Catalogue of Gas Plant and Machinery can be had on application.

Phœnix Engineering Works:

HOLLAND STREET, SOUTHWARK, S.E.

WANTED, Readers of the NEW Edition, 1879, "Cooking & Heating by Gas;" on Burners, &c. Copies, by post, Threepence, direct from the Author, MAGNUS OHREN, A.I.C.E., Gas-Works, SYDENHAM, S.E.

WANTED, by a Practical Gas Purifying Wood Sieve Maker, a Job.
Address W. K., 12, Brill Terrace, Pancras Road, LONDON.

WANTED, a Man and Lad to Labour and Light Lamps. Preference given to one who can work at the forge. State wages.
Apply to the MANAGER, Gas-Works, SLOUGH.

WANTED, a steady, efficient Tar Still-MAN, with good character. Must be well up to working last runnings.
Apply, by letter, to No. 570, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Re-engagement as MANAGER or ASSISTANT-MANAGER of a Gas-Works. 20 years practical experience. Most satisfactory reasons for change. Thorough knowledge of French.
Address No. 574, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by a Stourbridge House, an AGENT for Sale of Gas Retorts and Fire-Bricks in London and the South. Preference to one acquainted with the trade, or already known by the Gaslight Companies.
Address No. 569, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by a Young Man, a Situa-tion as STOREKEEPER to Gas-Works, either at home or abroad. Aged 22; single. Had 3½ years experience in a large locomotive stores. Unexceptional references and testimonials. Satisfactory reason for change.
Address No. 572, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO GAS-WORKS MANAGERS.

WANTED, a thoroughly Competent Man, both technical and commercial, to manage a Gas-Works in the West Indies. The person appointed must be able to speak Spanish, and be strictly temperate with drink.
The make of gas is about 10 million cubic feet per year. Term of engagement, three years. No person need apply who cannot speak Spanish.
Apply, by letter, to No. 571, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GAS-WORKS SUB-MANAGER.

WANTED, by the Corporation of Walsall, a Working SUB-MANAGER for the Walsall Gas-Works; to enter upon his duties early in November next. Salary £150 a year, with house, coal, and gas free. The appointment to be subject to three months notice on either side.
Applications, accompanied by not more than three testimonials, to be sent to the undersigned on or before Thursday, the 28th of August inst.
Applicants canvassing the members of the Corporation will be disqualified.
A statement of the duties and conditions of the appointment may be obtained on application to the undersigned.
SAML. WILKINSON, Town Clerk.
Walsall, Aug. 9, 1879.

ASSISTANT to Gas Engineer or Manager desires a Situation. Has had large experience in the Designing and Erection of Gas Plant, the Manufacture and Distribution of Gas; is also a good Draughtsman.
Address No. 573, care of Mr. King, 11, Bolt Court, Fleet Street, LONDON, E.C.

AN Engineer of large experience is in want of an Engagement as MANAGER or SECRETARY and MANAGER of a medium-sized Gas-Works. Manufacture of Residuals a specialite. Would go abroad. Payment by results. Testimonials and references to previous employers.
Address No. 567, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

A Gentleman (Assoc. Inst. C.E.), 29 years of age, wishes to obtain a Re-engagement as Engineer-in-Chief to a Gas Company abroad. Has had nine years experience in Gas matters, and received his professional education in two of the largest Gas-Works in Europe, and was employed for three years as Chief Engineer to a Gas Company abroad.
Address W. R. J., care of T. H. Devonshire, Esq., Solicitor, 1, Frederick's Place, Old Jewry, LONDON, E.C.

TO BE SOLD, Cheap, Three Telescopic GASHOLDERS, two 60 ft. diameter and 20 ft. deep each lift, and one 70 ft. in diameter and 20 ft. deep. Only been in use eight years. May now be seen at work at the Effingham Street Gas-Works, Sheffield.
For price, apply to THOMAS PIGGOTT AND Co., Spring Hill, BIRMINGHAM.

THE BROMLEY GAS CONSUMERS COMPANY.
NOTICE is hereby given that an ORDINARY HALF-YEARLY GENERAL MEETING of the Shareholders of this Company will be held at the Bell Hotel, Bromley, Kent, on Thursday, the 28th day of August inst., to receive the report of the Directors, the balance-sheet confirmed by the Auditors, to declare a dividend for the half year ending the 30th of June last, and for general purposes.
Notice is also given, that at such meeting resolutions will be proposed by the Directors to authorize the Company, under the provisions of the Bromley Gas Act, 1879, to create and issue 1000 new ordinary shares of £10 each, with a dividend limited to 7 per cent. per annum, and to offer such shares for sale by auction, at such times, upon such terms, subject to such conditions, and in such manner as the Directors may think fit.
The chair will be taken at Six o'clock precisely.
By order of the Board,
GEORGE H. OSBORN, Secretary and Manager.

EXHAUSTER FOR SALE.

FOR SALE, an Engine and Exhauster combined, to pass 7000 feet per hour, together with Boiler, 12 ft. by 4 ft., Boiler Fittings, Connections, Regulator, and Stone Bed.
For particulars, apply to W. T. TEW, Gas-Works, WARWICK.

FOR SALE—A Wrought-Iron Scrubber, 10 ft. by 3 ft., with 5-in. Connections, equal to new; Three 5-in. Hydraulic Valves, and Two Washers.
The above are for Sale in consequence of alterations, and, as the room is wanted, no reasonable offer will be refused for the whole or for a portion.
Apply to Mr. ARTHUR L. LEIGH, Gas-Works, Witney, OXON.

GAS PLANT FOR SALE.

A 10-in. Vertical Pipe Condenser, having 20 Pipes, each 19 ft. high, on Cast-Iron Base Box.
A Scrubber, 16 ft. high 5½ ft. diameter, fitted with thin boards, Self-Acting Liquor Distributor, 10-in. inlet and outlet pipes.
Two Single-Flue Cornish Boilers (new in 1870), each 9½ ft. long, 3 ft. 9 in. diameter; Fire Tube of Low Moor Iron, complete with all Fittings.
All in good working order; removed to make room for larger plant.
For further particulars apply to THOS. TREWHITT, Gas-Works, WEST HARTLEPOOL.
May 8, 1879.

TO TAR DISTILLERS.

TENDERS wanted for the Purchase of the Surplus TAR and AMMONIA WATER produced at the Penmaenmawr Gas-Works, North Wales.
Tenders to be sent in on or before the 24th inst., to
ROBERT DEMPSTER, Proprietor.

EXHAUSTER; Beale's 30,000 per hour. Makers, Burton and Waller. Fit for immediate use. For sale cheap.
For price and particulars apply to the MANAGER, Brentford Gas-Works, SOUTHALL.

DRY GAS-METERS.

WE have a large extra Stock of these, in three, five, and ten lights, of the best make, that we can offer at less than half the list price. Have been tested by the City Gas Inspector. Also a few 100 to 300 lights, equally low in price.
HODGE AND Co., Gas Engineers, 100 and 101, Hatton Garden, LONDON, E.C.

MILLOM LOCAL BOARD.

THE Local Board invite Tenders for a Supply of about 500 Tons of good GAS COAL, well screened and free from pyrites. To be delivered at the Millom Station between the present time and the end of August, 1880, in such quantities and at such hours as may be required.
Tenders to be sent to me not later than the 25th inst.
The Board do not bind themselves to accept the lowest or any tender.
JNO. POOLE, Clerk.
Millom, Carnforth, Aug. 6, 1879.

THE Middleton and Tonge Improvement Commissioners are prepared to receive TENDERS for the Supply of 6000 Tons of Good GAS COAL and 2000 Tons of CANNEL, the deliveries to extend over a period of 18 months from January, 1880. The Coal and Cannel to be delivered at the railway station, Middleton, or at the Gas-Works (carriage free) in such quantities as the Commissioners or their Manager may require.
Sealed tenders, addressed to the Chairman of the Gas Committee, to be delivered at the Office of the Clerk, on or before Monday, the 1st of September next, endorsed "Tender for Coal" or "Cannel."
Further information may be obtained from the Gas Manager, Mr. Hartley.
The Commissioners do not bind themselves to accept the lowest or any tender.
FREDERICK ENTWISTLE,
Clerk to the said Commissioners.
Commissioners Rooms, Middleton, near Manchester, Aug. 14, 1879.

EXHIBITION OF GAS APPARATUS.

WATT INSTITUTION, GREENOCK.

THIS Exhibition will open on Tuesday, the 9th of September, and continue for about a week.
Intending exhibitors are requested to send in application for space without delay.
Further information and exhibitors schedules may be had on application to SAMUEL STEWART, Manager of Gas-Works, GREENOCK.

THE Holywood Gas Company, Limited, are open to Purchase a Second-Hand EXHAUSTER and SCRUBBER, suitable to pass about 5000 feet per hour. Must be of approved make and in good condition.
Apply, with particulars, to
THOS. HUNTER, Secretary.
Holywood, Co. Down, Aug. 15, 1879.

WIDNES GAS-WORKS.

THE Widnes Local Board invite Tenders for the Purchase of the TAR and AMMONIACAL LIQUOR produced at their Works, for a term of Twelve months, from the 1st of October next.
Tenders, endorsed "TAR" or "Liquor," as the case may be, and addressed to the Chairman of the Gas and Water Committee, to be delivered at the above works (where conditions of contract can be obtained) not later than 10 a.m. upon the 30th of August.
The Board do not bind themselves to accept the highest or any tender.
HENRY ROBERTS, Engineer.
Public Offices, Widnes, Aug 11, 1879.

Now Ready, Price One Guinea.

PRECEDENTS in Private Bill Legisla-tion Affecting Gas and Water Undertakings. Compiled by Mr. G. W. STEVENSON, C.E., F.G.S.
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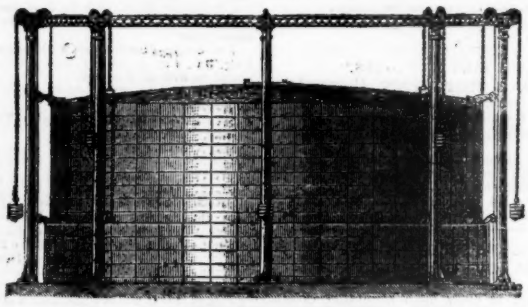

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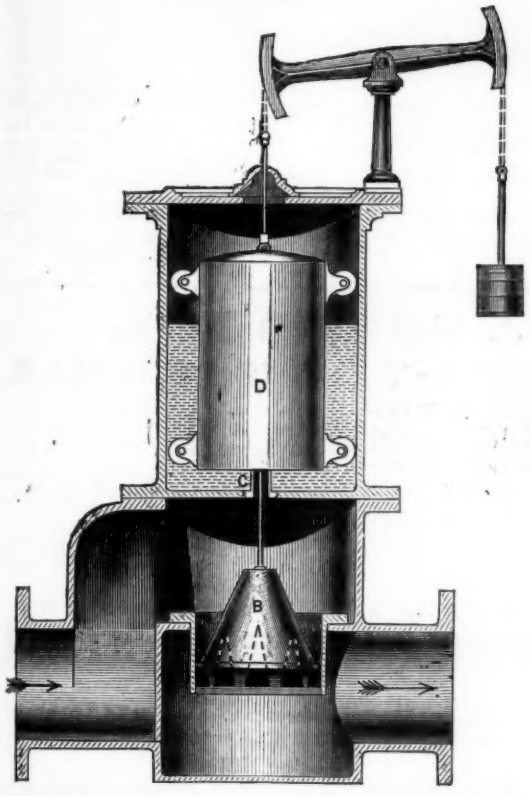

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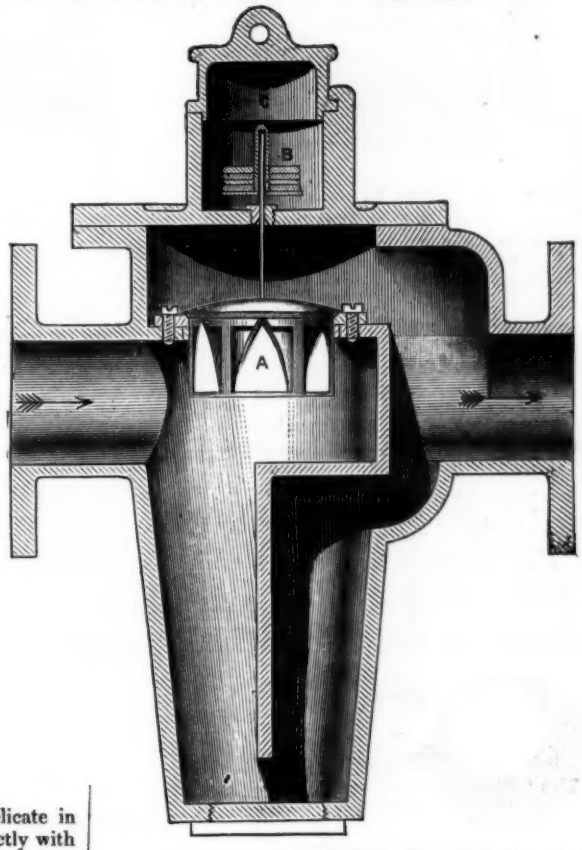

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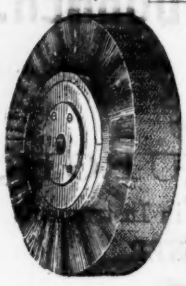

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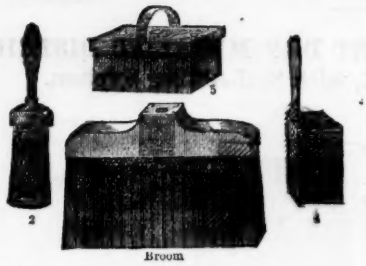

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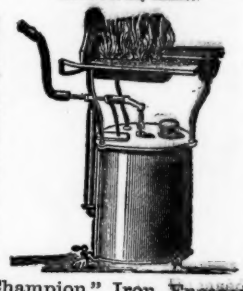

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3,	12 in. bellows,	to heat 2 in. sq. in 2 min.	6,	12 in. bellows,	to heat 3 in. sq. in 2 min. 168
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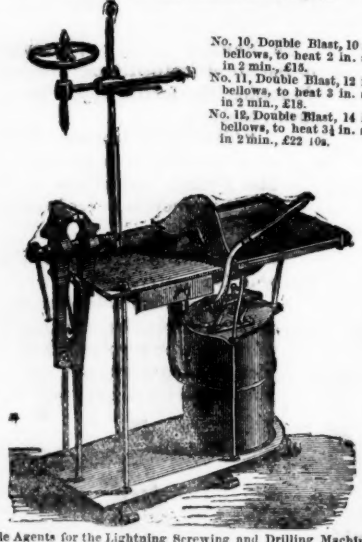

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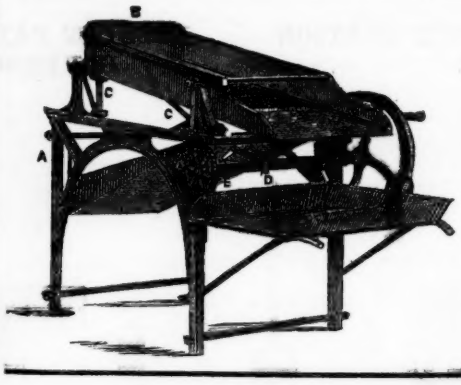

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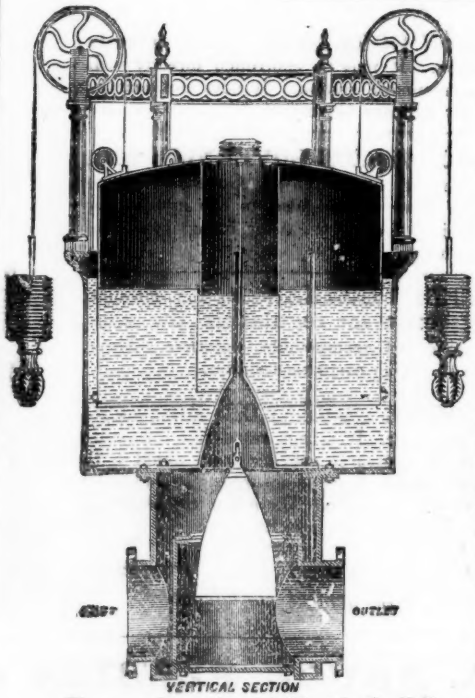

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The uniformity of pressure is obtained by introducing a compensating chamber into the Bell or Holder of the Governor, which compensator is of the same area as the valve, both of which are operated on by the initial pressure, thereby placing the valve in equilibrium, no matter what the initial pressure may be. The action on the Bell is by the Gas passing along a pipe from the outlet, and the pressure is regulated by weights in connexion with the Bell as required.

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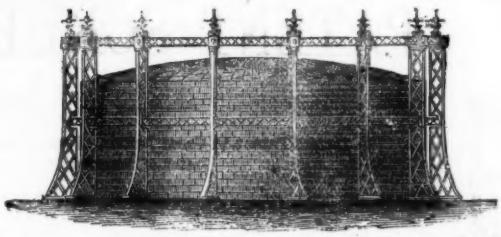

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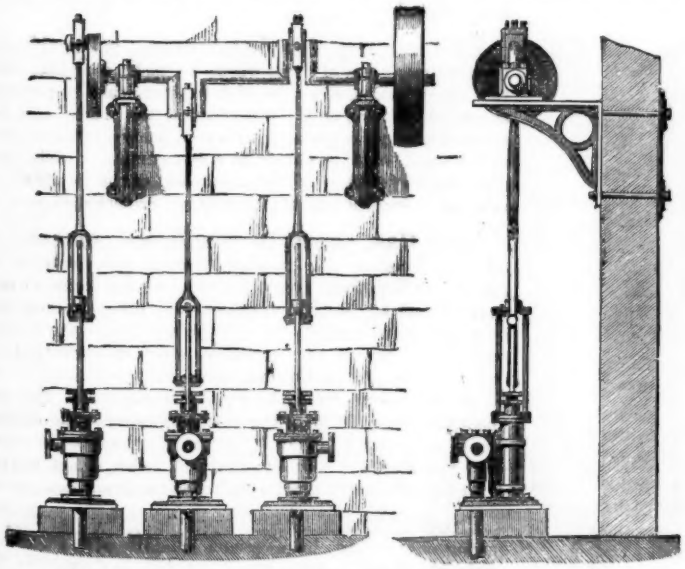

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COTSWOOD FIRE-BRICK WORKS, SCOTSWOOD-ON-TYNE.

Also Makers of all kinds of Common Building Bricks, and of Pressed White and Red Bricks for Facing.

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Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.

Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

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JAMES OAKES & CO.,

ALFRETON IRON-WORKS, DERBYSHIRE,

AND

WENLOCK IRON WHARF, 21 & 22, WHARF ROAD, CITY ROAD, LONDON, N.,

Manufacture and keep in stock at their works (also a large stock in London) PIPES and CONNECTIONS 1½ to 48 inches in diameter; and make to order Retorts, Purifiers, and Tanks, with or without planed joints, Columns, Girders, Special Castings, required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE.—Syphons and Covers are joint-faced if required, doing away with millboard and iron boring, or Syphons made without Covers, a socket being cast on and fitted with a small plug about 6 inches in diameter with lead joint. In either way preventing leakage.

THE

SILICA FIRE-BRICK CO.,

OUGHTIBRIDGE

Near SHEFFIELD,

Manufacturers of THE ORIGINAL SILICA OR DINAS FIRE-BRICKS. Specially adapted for Gas-Retort Furnaces and for Siemens's Gas-Furnaces. Shipments promptly executed to London, Liverpool, Hull, Grimsby, &c.

TROTTER, HAINES, & CORBETT,

BRETTELL'S ESTATE

FIRE CLAY & BRICK WORKS,

STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASS-HOUSE FURNACE & BLAST-FURNACE BRICKS LUMPS, TILES, and every description of FIRE-BRICK.

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BEST GLASS-HOUSE POT and CRUCIBLE CLAYS.

Successors to

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PROPRIETORS OF THE

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BEST STOURBRIDGE FIRE-BRICKS, LUMPS AND CLAY RETORTS

Of all Dimensions for Gas-Works,

GLASS-HOUSE POTS & CRUCIBLES

ESTABLISHED 1836.

The Highest Award was obtained by H. & M., at the Philadelphia Exhibition, 1876, for Superior Quality of Manufacture. SILVER MEDAL, PARIS, 1878.

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WILLIAM MACLEOD & CO.,

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CAST-IRON GAS AND WATER PIPES.

DELIVERY F.O.B., GLASGOW.

Prices on application.

C. & W. WALKER,
8, FINSBURY CIRCUS,
LONDON, E.C.

MANN & WALKERS' PATENT SCRUBBER.

By Letters Patent in Great Britain, Europe, and the United States of America.

By some important improvements recently patented, the purifying power of these Scrubbers has been much increased, and a stronger ammoniacal solution obtained, which is found to absorb a large portion of the carbonic acid contained in gas, effecting an important saving in money and labour in the lime purifiers, and where oxide only is used, the increase in the illuminating power of the gas obtained by these Scrubbers is shown in a remarkable degree, in consequence of the large quantity of carbonic acid removed from the gas.

It is to be particularly noted that the important results of these Scrubbers do not depend upon the machinery alone. The entire internal construction of the Scrubber bears an almost equally important part. For this reason, where it is desirable to convert existing Scrubbers, whose dimensions happen to be suitable, the work commences by ripping out the whole of the interior of the shell, and beginning the internal construction *de novo* from bottom to top.

Fifty million cubic feet of gas per 24 hours are purified from ammonia by these Patent Scrubbers in a winter's day in the gas-works of London, where the purity of gas supply is the highest in the world, under the chemical restrictions of the Board of Trade.

Generally, wherever a high standard of purification is maintained in the chief cities and towns of the British Provinces and of Europe, these Scrubbers have become established.

By their use the department of purification from ammonia upon a gas-works is made complete, without the aid of prepared oxide of iron, chemicals in purifiers, or any other supplementary process, and the whole ammoniacal residual product contained in the coal is absorbed and obtained in the form most profitable to a gas company, while the requirements of all Acts of Parliament and of the Board of Trade, relating to incorporate gas companies, are satisfied.

Foul Gas, properly condensed, entering the inlet is, by once only passing through the Scrubber, completely purified from ammonia with regular certainty day by day, without any further trouble, or any other process, effected by a very small quantity of clear water let into the machinery room at the top of the Scrubber, which is discharged at the liquor outlet at the bottom, from Newcastle coal at about 18 to 20 ounces strength, from Yorkshire and other coals generally from 25 to 30 ounces strength; while acidulated litmus or turmeric exposed at the Scrubber outlet will not show the slightest discoloration, and there is not a quarter of a grain of ammonia per 100 feet left unabsorbed.

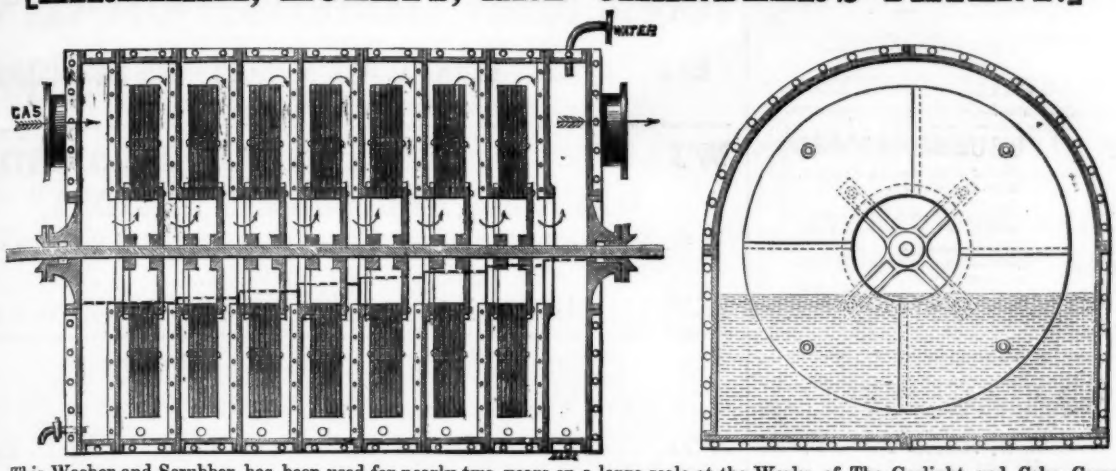
They contain their own engine power, requiring only a small inappreciable quantity of steam from the gas-works boiler, and are then complete in themselves, ready for service.

Applications relating to dimensions and prices should be addressed to us, C. AND W. WALKER, 8, FINSBURY CIRCUS, LONDON, E.C., or to Mr. WILLIAM MANN, late Superintendent of the Chartered Gas-Works, BLACKFRIARS, LONDON; they should state approximately the largest make of gas in 24 hours on a winter's day, and the smallest make on a summer's day, to be purified.

THE

"STANDARD" WASHER & SCRUBBER.

[KIRKHAM, HULETT, AND CHANDLER'S PATENT.]



This Washer and Scrubber has been used for nearly two years on a large scale at the Works of The Gaslight and Coke Company, Bromley-by-Bow, at which station there are now several in operation and in course of construction. There is also one in use at the Pancras Station, King's Cross, of the same Company, which is purifying 1,500,000 cubic feet of gas per day. At the Gas-Works of the Corporation of Leeds, a large one has been erected, which is giving complete satisfaction. The Special Merits of this Washer are as follows:—

That it is a very effective Condenser, so that it is not absolutely necessary to reduce the temperature of the gas to 60°, or thereabouts, to make the Washer effective. That the distribution of the liquor is made with unerring regularity. That it occupies very small space, so that it can be, at little expense, effectually protected from extreme changes of the weather. That the considerable expense of Coke or Wood, or other Scrubbing Material, is entirely saved, and that the great nuisance and cost of from time to time replacing the Scrubbing Material is avoided. That, by the revolution of the discs, the quantity of water carried up by them, and tending continuously to fall, exposes a very large amount of fresh wetted surface to contact with the gas. That it is particularly adapted for Gas-Works where Sulphate of Ammonia is manufactured. That it is much cheaper than any other Scrubber that will do the same amount of work effectually. That it is the only Washer suitable for purifying Gas from all its impurities by solution. That it works with a minimum of pressure. That it takes out every trace of Ammonia from the Gas in once traversing the machine. That it requires very little outlay for foundations.

The following Testimonials show the opinion of eminent Engineers as to the capabilities of the Washer:—

D. HULETT, Esq. *The Gaslight and Coke Company, Bromley-by-Bow, May 3, 1877.*

Dear Sir,—In answer to your inquiries respecting the results of the working of your Patent Washer, I beg to state that I find it a very efficient machine. I have had it in operation for some time, and passed gas through it continuously at the rate of 100,000 cubic feet per hour, and obtained from it 11 gallons of 10 oz. liquor per ton of coal carbonized—results which appear to me very satisfactory for so small a Washer. It works very smoothly, taking but little power, and giving no pressure. I have it still in operation, and am perfectly satisfied with its working.

I am, dear Sir, yours truly, (Signed) W. B. WRIGHT.

Messrs. KIRKHAM, HULETT, and CHANDLER. *The Leeds Corporation Gas-Works, York Street, Leeds, Dec. 6, 1878.*

Gentlemen,—The Scrubber-Washer erected by you at these works, and which has been in use for six months, has proved to be, so far as we have been able to test it, thoroughly efficient. We are at present making 32,000 feet of gas per hour, and are entirely dependent on this apparatus for the removal of Ammonia, and the **Gas is perfectly free from that impurity in the sixth chamber,** so that four chambers remain to deal with an increasing make of gas. Owing to insufficient condensers, the gas was in the summer admitted to the Scrubber at a temperature of 70°, but was reduced therein to 61°, or that of the atmosphere. The volutes are driven at the rate of four revolutions per minute, and, working at that speed, there is not the slightest difference between the inlet and the outlet pressure. Clean water supplied at the rate of 10 gallons per ton of coal carbonized is converted into liquor of from 10 oz. to 13 oz. strength **in once traversing the vessel.** The apparatus is extremely simple and compact, occupies but little space, and requires no foundation. I shall be surprised if it does not eventually become extremely popular.

I am, Gentlemen, yours faithfully, (Signed) HENRY WOODALL, Engineer.

Messrs. KIRKHAM, HULETT, and CHANDLER. *The Gaslight and Coke Company, York Road, King's Cross, Jan. 14, 1879.*

Gentlemen,—In reply to your inquiry, I am pleased to say, the Washer which was put in action at this station in October last has quite fulfilled my expectations, as it confirms the experiments I made in May last with the smaller machine. Working at four revolutions per minute, it **takes out every particle of Ammonia,** while purifying more Gas than it was intended to do. I enclose particulars of a fortnight's working during our heaviest make, by which you will see that it yields the full quantity and strength of liquor, and works with little pressure. I am therefore quite satisfied with the machine, and trust it may meet with the success it deserves.—I remain, &c. (Signed) JOHN CLARK.

The following Table shows the results of the working of one of these Washers, lately erected to purify 60,000 feet of Gas per Hour, at the St. Pancras Station of The Gaslight and Coke Company:—

1879.	Nos. of the Divisions and Strength of Liquor in each.										Water used per Ton of Coals.	Gas Purified per Hour, Cubic Feet.	Ammonia on Outlet.	Temperature.			Pressures.		Revolutions per Minute.
	1	2	3	4	5	6	7	8	9	10				Inlet.	Outlet.	Atmosphere.	Inlet, Inches.	Outlet, Inches.	
	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.									
January 1	8½	6½	5	3½	2½	1½	¾	½	0	0	10 Gallons.	52,000	Nil.	77°	73°	48°	24	23	7½
,, 2	8½	7	6	4½	3½	2½	1½	¾	½	0	10 ,,	57,000	Nil.	73°	66°	32°	21¾	20½	4
,, 3	9½	8	6	3¾	3	2½	1½	¾	½	0	10 ,,	60,000	Nil.	75°	68°	40°	23½	22	4
,, 4	9½	7¾	6½	4½	3½	2½	1½	¾	½	0	10 ,,	65,000	Nil.	74°	68°	33°	24	22½	5
,, 5	9½	7	6	4	3	2¾	1¼	1	½	0	10 ,,	34,000	Nil.	77°	68°	35°	14½	14	5
,, 6	9½	7½	6½	4½	3	2½	1½	1	½	0	10 ,,	63,000	Nil.	72°	66°	27°	24	22½	4½
,, 7	11	9	7	5½	3½	3	1¾	1½	½	0	10 ,,	59,000	Nil.	74°	66°	31°	25	23½	5
,, 8	9½	7½	6	4½	3	2	1	¾	½	0	10 ,,	78,000	Nil.	73°	61°	31°	28	26½	4½
,, 9	11	9	7	5	3½	2½	1½	1	½	0	10 ,,	82,000	Nil.	74°	67°	33°	27½	25½	5
,, 10	10½	8½	6½	5	3½	2½	1½	1	½	0	10 ,,	66,000	Nil.	76°	64°	28°	28½	27	5
,, 11	12½	10	7½	5½	4½	3½	1¾	1¼	½	0	10 ,,	61,000	Nil.	73°	64°	27°	26½	25½	5
,, 12	11	8½	6½	—	—	—	1¼	¾	½	0	10 ,,	39,000	Nil.	74°	64°	27°	26½	25¼	5
,, 13	13	10½	8½	6	4½	3½	2	1½	½	0	10 ,,	78,000	Nil.	73°	65°	42°	28	26	5

Messrs. KIRKHAM, HULETT, and CHANDLER. *Corporation of Birmingham, Gas Department, Saltley Works, May 23, 1879.*

Gentlemen,—I beg to enclose you a copy of the results of the tests which, by the kind permission of the Engineer, Mr. Clark, I made on the 6th of March last, of the working of one of your "Standard" Washers and Scrubbers at the St. Pancras Station of The Gaslight and Coke Company, and I am of opinion that, for an apparatus occupying so small a space, they are exceedingly satisfactory.—Yours truly, HENRY HACK, Engineer.

Working Results obtained from KIRKHAM, HULETT, *and* CHANDLER'S *Patent "Standard" Washer and Scrubber at the St. Pancras Station of The Gaslight and Coke Company, London, March 6, 1879.*

Gas passing per Hour, Cubic Feet.	—	Impurities in Gas per 100 Cubic Feet.			Temperature.		Pressure in Inches.	Revolution of Apparatus per Minute.	—	No. of Divisions and Strength of Liquor.										Water Used during Experiment. Gallons.
		SH_2	CO_2.	Grains. NH_3.	Washer.	Air.				—	—	—	—	—	—	—	—	—	—	
84,000	Inlet	2·00	2·00	158·8	72	57	21	4½	Twaddel deg. at 60°	5·3	4·9	2·85	2·35	1·7	1·05	0·6	0·3	0·15	0·1	63
	Outlet	1·50	1·50	0·8	68	57	20		Acid, ounces.	11·0	8·4	6·3	4·5	2·7	1·7	1·3	0·7	0·3	—	

WASHER-SCRUBBERS OF THIS PATENT ARE IN COURSE OF CONSTRUCTION FOR BECKTON, BRADFORD, GREENWICH, WOOLWICH, AND SEVERAL OTHER GAS-WORKS.

For further particulars and testimonials, address

Messrs. KIRKHAM & HERSEY, GAS ENGINEERS, 21, ABINGDON STREET, WESTMINSTER.

ROBERT MARSHALL,

CANNEL COAL MERCHANT,

198, ST. VINCENT STREET, GLASGOW.

SHOTT'S BOGHEAD.

HARTHILL CANNEL

Yields 14,920 cubic feet of 40·92-candle gas per ton.

THRASHBUSH CANNEL

12,530 cubic feet of 40·22-candle gas per ton, and 9 cwts. of good coke.

LOTHIAN'S CANNEL

Yields 12,500 cubic feet of 34-candle gas per ton, and 9 cwts. of excellent coke, containing only 4 per cent. of ash.

MUIRKIRK, No. 1, CANNEL

Yields 12,160 cubic feet of 32·5-candle gas per ton, and 10 cwts. of excellent coke, containing only 5 per cent. of ash. This cannel is almost free from sulphur.

OLD WEMYSS CANNEL

Yields 13,320 cubic feet of 32·5-candle gas per ton.

Prices and full analyses on application at above address, or from WEDDERSPOON, FERGUSSON AND CO., 91, Lime Street, LONDON, E.C.

GAS COAL.

THE MIRFIELD COAL COMPANY are supplying GAS COAL of the best quality on trucks at their siding. This Coal contains 10 per cent. of Cannel, and, as analyzed by Mr. James Paterson, of Warrington, yields 12,600 *cubic feet of* 16·67 *candle gas, with* 1430 *lbs. of good Coke, per ton.* Ash in Coke, 1·88.

Apply to the MIRFIELD COLLIERY, Mirfield, NORMANTON. London Agents: SMITH BROS., 38, THROGMORTON ST., E.C.

HEBBURN MAIN GAS COAL.

This Coal is now highly approved of for gas making, and yields over 10,000 feet per ton of 15-candle gas, and about 14 cwt. coke.

For references and prices, either f. o. b. or by rail, apply to

W. RICHARDSON,

29, QUAYSIDE, NEWCASTLE-ON-TYNE.

GAS COAL.

THE Tawd Vale Colliery Company, Limited, are prepared to Contract for the Supply of their superior Arley and other GAS COALS, and to send samples to the order of Gas Engineers and others, or complete analysis on application. Shipped at Liverpool, Preston, Fleetwood, Garston, or Birkenhead.

Mr. James Paterson, C.E., F.G.S., in his analysis of T. V. Arley Coal, says: "Some parts merge into a semi-Cannel; Gas per ton, 10,300 cubic feet; illuminating power, 16·96 candles; coke of high quality, 1431 lbs. per ton."

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POPE & PEARSON, LIMITED, have now the authority of several of the most eminent Gas Engineers of London in stating that their Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles;* or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17½ candles.

One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

For further particulars, apply to POPE AND PEARSON, LIMITED, West Riding and Silkstone Collieries, near LEEDS.

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All negotiations respecting M. Brémond's patented process for preventing Deposits of

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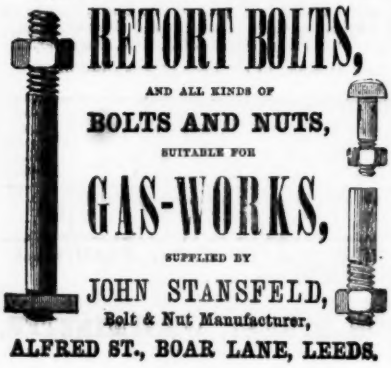
in Gas Main and Service Pipes should be addressed to Mr. W. H. BENNETT, 22, Great George Street, WESTMINSTER, S.W., or to M. BREMOND, Gas Engineer, Companie Madrilena de Alumbrado y Calefaccion por Gas, MADRID, who may be consulted upon all matters connected with the Gas Industry.



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AND ALL KINDS OF

BOLTS AND NUTS,

SUITABLE FOR

GAS-WORKS,

SUPPLIED BY

JOHN STANSFELD,

Bolt & Nut Manufacturer,

ALFRED ST., BOAR LANE, LEEDS.

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AND

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Analyses and Quotations on application.

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GAS COAL AND CANNEL FACTORS,

Supply to any Railway Station or for Export all kinds of Fuel for Gas purposes.

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GAS AND CONSULTING ENGINEER,

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PATENTEE and MANUFACTURER of the following Inventions:—

RETORT SETTINGS—giving great Economy of Fuel.

STEAM-ENGINES and EXHAUSTERS, FOUR-WAY VALVES, WASHERS, SCRUBBERS.

FUEL-MACHINE, for Compressing Breeze and Tar.

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PRICES AND ALL PARTICULARS TO BE HAD OF THE PATENTEE,

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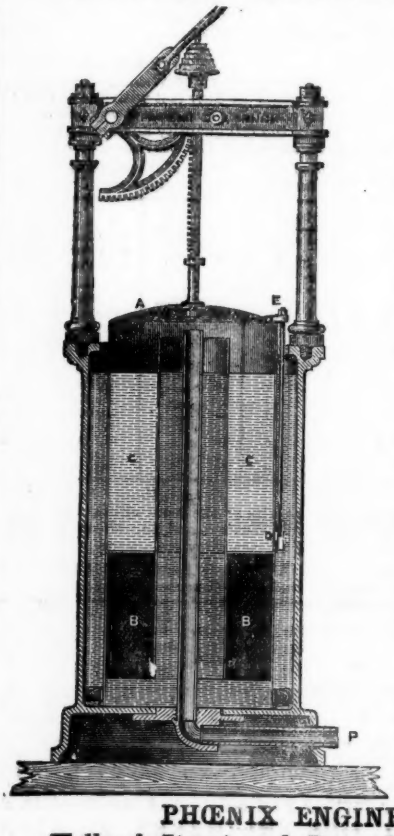
GEORGE WALLER & CO.,

GAS AND HYDRAULIC ENGINEERS,

Patent Compensating Steam Governor,

WITH SELF-CONTAINED WATER-BALANCE.



DESCRIPTION OF THE APPARATUS.

The illustration represents a section of the Patent Governor. The lower part of the Bell A is fitted with a loose Float B, and in the upper part of the Bell is a deep annular Water Chamber C, at the bottom of which is an opening D, with a slide outside regulated by a Screw Spindle E, to allow the water to pass in and out of the Chamber C quickly or slowly, according to circumstances, but when once adjusted the slide does **not require altering.** This Self-compensating Chamber gives great steadiness to the up and down movement of the Bell and effectively prevents the "hunting" motion so common with other Governors, thereby ensuring a more perfect action on the throttle-valve of the Engine **than attained by any other.** The sketch shows the clip lever fixed to work on throttle-valve at an angle, and can work in either direction. P is the Gas Inlet-pipe to Governor.

G. W. & Co. also make **special Steam Throttle Valves,** suitable for working with this Governor, and alter existing Throttle Valves to same plan.

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FOR THE ERECTION AND REBUILDING OF GAS AND WATER WORKS,

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ROBUS'S IMPROVED RETORT-SETTINGS, guaranteed to Carbonize a large amount of Coal with a small per cent. of Fuel.

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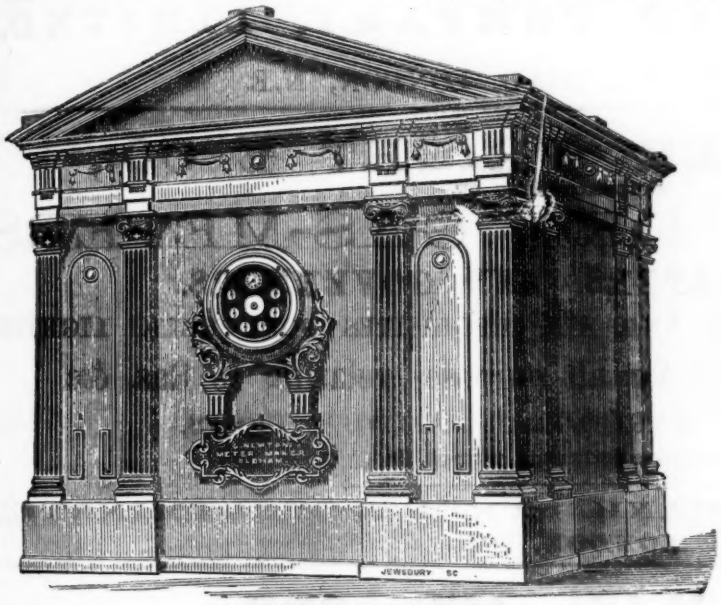
UNION STREET WEST, OLDHAM,



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TRADE MARK

These Paints have been for many years extensively used in Her Majesty's Royal Dockyards, Woolwich Arsenal, the Shorncliffe and Curragh Camps, War Departments, and Colonies, and are largely supplied to Railway, Harbour, and GAS COMPANIES, Shipowners, Engineering Establishments, Railway Carriage and Wagon Works, and the Paint Trade generally. They are the BEST PROTECTORS of WOOD, CEMENT, and IRONWORK, even arresting corrosion after it has set in; and their base being oxide of iron, they are free from those properties which make lead paints so destructive to iron. They do not scale or blister, are not affected by great heat, and are the **only Paints which will resist the effects of sulphuretted hydrogen.** Their DURABILITY and covering properties have borne the test of A QUARTER OF A CENTURY'S PRACTICAL TRIAL.

The undermentioned colours—ground in best linseed oil, and requiring only to be thinned down for use in the ordinary way—are kept in stock:—

Torbay Brown.	Torbay Red.
Dart Green.	Slate.
Dart Yellow.	Buff.
Brixham Black.	Torbay Chocolate.
Light Blue.	Cream Colour.
Dart Brown.	Dart Umber.
Imperial Stone.	Light Stone.
Bronze Green.	Salmon Colour.
Navy Green.	Lead Colour.
Carriage Red.	Dark Stone.
Light Lead.	Crystal Palace Blue.
Light Green.	Iron Grey.

All other Colours made to order.

READY-MIXED PAINTS.

A great variety of Colours ready mixed for the brush are also always kept in Stock, in 3 lb., 7 lb., 14 lb., and 28 lb. cans.

Prices and Testimonials on application.

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Mr. RICHARD HARTLEY . . . . . **Managing Director.**

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JAMES PATERSON Esq., Gas Engineer, of the Warrington Gas Company, reported, Aug. 10, 1875:—

"This Coal possesses remarkable qualities as a gas and coking coal, and appears SECOND TO NONE IN THE KINGDOM. It contains the large quantity of 699 lbs. of illuminating matter, and 1498 lbs. of coke to the ton, and produces **12,240** cubic feet of 16·66 candle gas."

The above Company are raising nearly a thousand tons of the Real Old Silkstone Gas Coal per working day.

PRICES QUOTED TO ANY RAILWAY STATION, OR F.O.B. HULL, GRIMSBY, GOOLE, KEADBY, LIVERPOOL, AND FLEETWOOD.

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R. W. WALLACE & CO.,

60, MARK LANE, LONDON, E.C.,

Are Buyers of SULPHATE AMMONIA in Large or Small Quantities, or Sell on Commission for Gas Companies and Makers.

PLANT ERECTED ON THE LATEST AND MOST APPROVED PRINCIPLE.

AGENTS to THE GASLIGHT AND COKE COMPANY, LONDON, for the SALE of SULPHATE AMMONIA. Works: BECKTON.

CROLL'S
DRY GAS-METERS,

PRIZE MEDALS.
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(INVENTED & PATENTED IN 1844,)

COMBINING ALL THE LATEST IMPROVEMENTS,

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THE GAS-METER COMPANY, LIMITED,

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METERS, BOXES, REGULATORS, AND ALL REQUISITES FOR PUBLIC LIGHTING.

TESTING APPARATUS for all purposes relating to Gas, &c.

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